

Section 4: ENVIRONMENTAL CONSEQUENCES AND MITIGATION

This section presents an analysis of the potential consequences, both beneficial and adverse, of the No-Action and Build Alternatives for the I-69 project with respect to transportation, social and economic, physical and biological, and atmospheric conditions. This section discusses primary, direct impacts (the loss of a resource) and, where feasible, indirect impacts (changes in the function or quality of a resource). Indirect and cumulative impacts are discussed, as well as measures that would be implemented to mitigate unavoidable impacts.

4.1 SOCIAL IMPACTS

The Project passes through a predominantly rural landscape about fifteen miles south and east of the Shreveport metropolitan area. Development is limited to towns associated with area highways. The alignments were specifically developed and located within the Preferred Corridor through sparsely populated areas currently in use for agricultural, oil and gas, and timber purposes to minimize community, residential, and business impacts while attempting to maximize public access to this transportation facility.

Social impacts in rural areas may not necessarily be dictated by the physical location of the proposed highway in a particular community, but rather by

the presence of the proposed highway through the local area, regardless of the particular alignment location. For this reason, all alignments are expected to have similar social impacts unless otherwise noted. Social impacts associated with the No-Action alternative would be minimal and are described where appropriate.

4.1.1 Land Use and Land Cover Changes

The Project will have both direct and indirect impacts to existing land uses and land cover. The construction of the highway will result in the direct conversion of land currently in forest or agricultural production, to a transportation use. The proximity to highway access could spur indirect land use impacts resulting from new or increased residential, commercial, or industrial development in the Study Area.

Land Cover Conversion

Land directly used by the proposed highway would be converted from its present use to transportation use as shown in Table 4-1. For the majority of the route, land would be converted from forested lands. Impacts to these land covers and vegetative communities are discussed in Section 4.11. Line 2 would convert the least amount of land to highway use while Line 3 would convert the most.

Table 4-1
SUMMARY OF LAND COVER IMPACTS

Alignment	Forested (ac)	Pasture/Cropland (ac)	Wetlands (ac)	Developed (ac)	Totals (ac)
No-Action	0	0	0	0	0
Line 1	1,119.8	501.1	52.1	22.5	1,695.5
Line 2	1,102.2	488.2	48.0	20.5	1,658.9
Line 3	1,111.0	524.1	55.7	25.9	1,716.7
Line 4	1,130.3	464.0	58.2	15.4	1,667.9
Line 5	1,138.2	479.2	46.7	17.3	1,681.4
Line 6 (DEIS Preferred)	1,155.9	487.3	43.8	23.4	1,710.4
Selected ¹	1,155.9	475.1	43.0	23.4	1,697.4
Frontage Road (Selected)	60.2	12.5	0.7	3.4	76.8

Source: Michael Baker Jr., Inc.

¹ Selected Alignment is Line 6 with minor modifications

The No-Action alternative would not result in any development beyond what the current development trends would indicate. Scattered residential development will continue to occur as land becomes available.

Indirect Development

The Project could facilitate indirect development in the Study Area to some extent regardless of the alignment selected. This development could take several forms:

- ☐ commercial development at interchanges
- ☐ industrial development in new industrial parks
- ☐ recreational development that may result due to improved access

- ☐ single site industrial developments by manufacturing enterprises that locate in the area due to improved access
- ☐ residential development that may result due to community growth and improved access to nearby job markets.

Hartgen and Kim (1998) found that the extent and type of rural interchange development is influenced by the size of the nearby community, the services offered, and the distance to that community. The development would generally be proportional to the size of the community and inversely proportional to the distance from that community. That is, more development would be expected at larger communities with an interchange close by than for smaller communities with an interchange farther

away. The size and distance variables are not absolute and exceptions to these general trends can and often do occur. Precise predictions of type and extent of development are not possible.

Interchanges are located to provide access to the local highway network, facilitating Interstate travel opportunities for Study Area residents. All Lines have proposed interchanges at U.S. 171 near Stonewall, I-49, LA 1, U.S. 71, LA 157 south of Haughton, and at I-20. Little development would be expected at these interchanges because a variety of services exist in the Shreveport-Bossier metropolitan area, which is in close proximity (5-11 miles) to all of these interchanges. For example, an existing interchange was provided at LA 3276 for access to I-49, which is located about 1.4 miles north of the proposed Project interchange with I-49. Since the interchange was open to traffic, additional residential subdivision development along LA 3276 between I-49 and U.S. 171 has occurred.

Lines 1, 3, 6 (DEIS Preferred Alignment) and the Selected Alignment would have proposed interchanges at LA 1 at the Port of Shreveport-Bossier and at U.S. 71. The proposed interchange at U.S. 71 is close enough to a sizeable population that some indirect development is likely to occur. The Port is expanding its operations and light commercial development would be expected to continue.

Additionally, Lines 2, 4, and 5 have proposed interchanges at LA 1 and U.S. 71 about 3 miles to the south of Lines 1, 3, 6 (DEIS Preferred Alignment) and the Selected Alignment. Both locations are close enough to a sizeable population and far enough away from existing services that light commercial development would likely occur. Currently, both locations are surrounded by pastureland that could accommodate some form of limited development.

Single site industrial development could occur near the proposed highway where land is available. This development would be limited by the services and infrastructure local communities could provide. This type of development would most likely be confined to areas where supporting infrastructure would be available closest to the Shreveport-Bossier metropolitan area along LA 1 and U.S. 71. Furthermore, additional residential development may occur in the communities of Stonewall, Elm Grove, and Haughton due to improved access by the proposed highway.

The No-Action alternative would not result in any development beyond what the current development trends would indicate. Scattered residential development will continue to occur as land becomes available. Limited commercial growth would continue at the Port of Shreveport-Bossier.

Consistency of Highway and Indirect Development with Land Use Plans

The Northwest Louisiana Council of Governments' (Shreveport-Bossier City area Metropolitan Planning Organization (MPO) transportation planning committee, have participated in several meetings at various stages of the project to discuss both land use and transportation issues as they relate to the development of the Project. As discussed in Section 2.3.10, the MPO expressed their preference for an alignment following the northern route of the Preferred Corridor.

Elected officials from Stonewall and Haughton have actively participated in the project development process and have been an active voice in the decision-making process.

4.1.2 Community Changes

The Project would result in changes to neighborhoods, travel patterns, local traffic, community services, and property values. These changes would be most evident in communities in or adjacent to the highway. All alignments are expected to have similar community impacts.

Neighborhoods and Community Cohesion

The alignment development process was designed to fully consider potential community impacts at both the corridor and alignment level of study. Corridor location involved an attempt to avoid all area communities and neighborhoods to the greatest extent practicable, and subsequent alignment development focused on avoidance of

individual residences and businesses. Lines 1, 3, 6 (DEIS Preferred Alignment) and the Selected Alignment would cross a residential area along Pine Hill Road in order to avoid other clusters of residential development along LA 527 to the south, and Goat Hill Road, Caplis Sligo Road, and LA 157 to the north.

Attempts were made to avoid small clusters of residences in outlying areas. Community cohesion for the more scattered residences in the Study Area would be maintained via highway overpasses/underpasses of the local roadways.

The No-Action alternative would not directly impact neighborhoods. Widening projects may disrupt individual residents, but would not likely divide any existing neighborhoods.

Community Access and Travel Patterns

Grade separations are proposed for all alignments at all existing U.S. highways, state highways, and parish road crossings via overpass or underpass structures depending on roadway alignment and terrain. Access within and between communities would not appreciably change as a result of this project. Maintenance of access to individual property parcels would be considered and addressed during the final design of the highway.

Most communities within the Study Area will have access to the proposed highway via six interchange locations. In the western portion of the Study Area, access to the community of Stonewall would be

provided by interchanges at U.S. 171 and I-49. An interchange at LA 1 would provide access to the community of Frierson via LA 175. Access to the community of Elm Grove would be provided by an interchange along U.S. 71. In the eastern portion of the Study Area, an interchange at LA 157 would provide access to the communities of Oakland and Koran via LA 527. Access to Haughton would be provided by an interchange at I-20. Shreveport area residents could access the highway with proposed interchanges at I-49 and LA 1. Bossier City residents could access the highway at proposed interchanges at U.S. 71 and I-20.

The No-Action alternative limits the accessibility to an Interstate highway for many area residents. Study Area residents that need to travel between Stonewall and Haughton, without heading northward through Shreveport, would have to use the existing roadway network that provides an indirect travel path between the two communities with a limited number of bridge crossings several miles north of the Preferred Corridor. While these roads are acceptable for community travel, they do not provide the convenience and safety of an Interstate highway.

Travel patterns in the Study Area may change as a result of the proposed highway. Residents would have a choice to travel on the existing roadway network or I-69 depending on their final destination. Travel time between Stonewall and Haughton would be reduced especially during peak traffic

hours or periods of construction and safety would be increased through the use of the new facility.

The No-Action alternative fails to complete the regional Interstate highway system and does not provide direct Interstate access for area residents. Residents that are located in the central portion of the Study Area would need to travel to LA 1 or U.S. 71 to access Interstate travel to the east or west. While these roads are acceptable for community travel, they do not provide the convenience and safety of an Interstate highway.

Changes in Local Traffic

Changes in local traffic would result from all highway alignments. Residents living or traveling along roads such as U.S. 171, LA 175, LA 1, U.S. 71, LA 527, LA 157, LA 164, and U.S. 80 may experience a decrease in the traffic volumes, particularly truck traffic, as through trips are diverted to the new highway facility. Most truck traffic currently traveling these routes within the Study Area would benefit from the increased transportation efficiency provided by an Interstate highway.

Community Services and Facilities

Most residents within the Study Area would need to travel 15-20 miles to the Shreveport metropolitan area for major medical and other professional services. Residents would travel northward on U.S. 171 from Stonewall, U.S. 71 from Elm Grove, and LA 1 near the community of Caspiana to

assess these services. Moderate to heavy traffic would likely be encountered as the Shreveport-Bossier area is approached. Travel on I-69 for northward travel on I-49 would improve access to services especially in times of medical emergencies. Accessibility to community services would be improved by all alignments.

Adequate fire and police services are important for the protection of citizens and property in all communities. Construction of I-69 would benefit the Study Area by reducing emergency response times between communities by removing through traffic from the local roadway network.

The proposed highway would not affect access to churches, schools, and public facilities. Grade separations proposed at all existing U.S. highways, state highways, and local road crossings via overpasses or underpasses would maintain facility access. Lines 1, 3, and 6 (DEIS Preferred Alignment) would impact the Elm Grove Baptist Church. No other community facilities would be directly impacted.

The No-Action alternative would not result in improved community service accessibility or improve emergency response times. Increased traffic congestion along U.S. 71, U.S. 171, and LA 1 and adjacent roadways could make community facility access more difficult and time consuming.

Property Values

Property values could increase along highways for which an interchange has been proposed as land becomes more desirable for commercial and industrial development. Commercial development and associated increased property values are more likely to occur at interchange locations near existing communities.

The value of residential units adjacent to the proposed highway is difficult to predict. Individual home values are based on each owner's and the potential buyer's perception of the benefits of an adjacent highway and would vary on a case-by-case basis.

Indirect Community Impacts

Indirect development that could occur as a result of the proposed highway would affect the daily lives of residents in nearby communities. All alignments would produce similar indirect development. The degree to which indirect development may occur is dependent on many variables and is difficult to precisely predict. Residential areas may become more densely populated, demands on utilities and social services may increase, and farmlands, forests, and pasture may be converted to residential areas and other forms of land use. This growth is likely to occur over an extended period of time and is likely to follow current residential growth patterns observed in the Study Area where local community officials, planners, developers, and service providers have provided the basic

infrastructure conducive to residential development. Indirect development and potential community change such as this can be perceived as positive or negative. New development often means new jobs, increased economic vitality and a higher population. To some this change is unwanted while to others it is desirable and vital.

Development that may occur at interchanges could indirectly affect the residents living along these highways. The land adjacent to the proposed interchange could change from solely residential and farm use to light commercial use such as restaurants and service stations. While nearby residents may enjoy the convenience of these services, the previous rural character of their residence would have changed.

The No-Action alternative would not likely result in indirect development or associated change in communities beyond the current development trends.

4.1.3 Safety

The construction of I-69 would have a positive impact on both highway and overall public safety, including bicycle and pedestrian safety, within the project area. All alignments would have a similar affect on safety.

Highway Safety

Freeways eliminate many safety concerns associated with other roadways. Traffic on the proposed highway would encounter fewer access

points than along existing routes, a factor that correlates to accident rates. Medians separate opposing traffic streams, provide a recovery area for out-of-control vehicles, and provide a place for vehicles to stop in the event of an emergency. Traffic traveling on U.S. and state highways within the Study Area frequently encounters vehicles turning onto or out of side roads or driveways, which can lead to collisions.

Pedestrians and Bicyclists

Limited pedestrian and bicycle activity exists where the proposed highway would cross U.S. and state highways within the Study Area near the communities of Stonewall, Frierson, and Haughton. Pedestrian and bicycle safety could improve as through traffic and truck traffic is diverted to the proposed highway.

The No-Action alternative could result in additional traffic accidents, fatalities, and property damage along the Study Area roadways due to the future increase in traffic volumes and increased congestion.

4.1.4 Relocations

All alignments will displace residents. Line 2 would displace the Pro Fab Welding Service in Haughton. Line 3 would impact Regency Gas in Haughton. Lines 1, 3, and 6 (DEIS Preferred Alignment) would also displace the recently constructed Elm Grove Baptist Church. Lines 2, 4 and 5 would displace the Lucas Sludge Disposal Facility, a public facility,

near Gayles. Lines 2 and 4 would also impact properties owned by Yogie and Friends Exotic Cat Sanctuary in Frierson. Structures were initially identified on 1998 and 1999 aerial photographic mapping, field verified, and entered into the Project GIS for impact assessment. Revisions and updates were made to this information during the Alignment Study and again prior to distributing the Draft EIS to include all currently existing residences and businesses. Structures were again updated using NLCOG 2009 digital orthophotography prior

to identifying the Selected Alignment. An effort to minimize residential, business, and community facility impacts was made during both the corridor and alignment study. Further steps to minimize displacements will be considered during the final design of the highway.

Table 4-2 compares the relocations for all alignments. Line 5 would have the least number of relocations while Line 1 would have the most.

Table 4-2 RELOCATION SUMMARY							
Alignment	Structure/Facility Type						Total
	House	Mobile Home	Business	Community Facilities		Public Facility	
				Church	Park		
No-Action	0	0	0	0	0	0	0
Line 1	11	23	0	1	0	0	35
Line 2	10	8	1	0	0	1	20
Line 3	10	21	1	1	0	0	33
Line 4	12	10	0	0	0	1	23
Line 5	8	10	0	0	0	1	19
Line 6 (DEIS Preferred)	8	22	0	1	0	0	31
Selected ¹	7	21	0	0	0	0	28
Frontage Road (Selected)	2	0	0	0	0	0	2

Source: Michael Baker Jr., Inc.

¹ Selected alignment is Line 6 with minor modifications

The No-Action alternative could result in future relocations as minor safety improvements and additional widening or passing lane projects are implemented within the Study Area. All future projects will include measures to minimize

relocations to the extent practicable. Due to the existence of numerous residences along area highways, it is reasonable to assume that some impacts to residences would occur as improvement projects are implemented in the future.

Relocation Mitigation

An assessment was made of the available housing to determine its comparability with the relocatees' needs. An Internet search was conducted to determine available housing within the Study Area (Home Gain 2011). The results are summarized in Table 4-3.

The DOTD conducts the acquisition and relocation process in accordance with the Uniform Relocation Assistance and Real Property Policies Act of 1970.

Table 4-3 CURRENT AVAILABLE HOUSING¹		
Area	Price Range	Number
Stonewall	89,900 – 279,900	12
Frierson	25,000	1
Elm Grove	33,000 – 350,000	5
Haughton	35,000 – 459,900	65

Source: Michael Baker Jr., Inc., Home Gain 2011

¹ Housing units generally fall within Study Area from U.S. 171 to I-20.

Relocation assistance will be made available to all residential and business relocatees without discrimination as to race, color, national origin, age, sex or religion. In all cases, decent, safe and sanitary housing will be made available for all relocatees. The DOTD is committed to locating replacement housing within the occupant's financial means and within the general area of the project and when necessary providing housing of last resort. A Conceptual Stage Relocation Plan was prepared for the Selected Alignment and is included in Appendix L. Real estate availability will be reassessed once final design of the highway has been completed.

4.2 SECTION 4(f) AND SECTION 6(f) RESOURCES

Section 4(f) of the Department of Transportation Act of 1966, as amended (49 U.S.C. 303) protects public parks, publicly owned recreation areas, wildlife and waterfowl refuges, and historic and/or cultural resources of national, state or local significance from conversion to highway use unless there is no prudent or feasible alternative.

Section 6(f) of the Land and Water Conservation Fund Act of 1965, (Public Law 88-578) prohibits property acquired or developed with assistance under the Act from being converted to other than public outdoor recreation uses without the approval of the Secretary of the Interior.

No resources protected by either Section 4(f) or Section 6(f) would be impacted by the No-Action or Build alternatives.

4.3 ENVIRONMENTAL JUSTICE

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, directs all Federal agencies to determine whether a proposed action would have an adverse and disproportionately high impact on minority and/or low-income populations. In addition, elderly populations (>65 years old) were also assessed. The objective of the Environmental Justice policy is not to develop alternatives that simply move the impacts from one affected group to another, but to fully and equitably consider potential project impacts to minority and low-

income populations during the project development process.

4.3.1 Methodology

Fifteen U.S. Census Bureau 2000 Census Block Groups were identified within the Study Area and initially examined to determine the presence of minority, low-income, or elderly populations within the Study Area (see Table 3-7 and Exhibit 3-1). Comparisons using the 2010 Census of Population and Housing or the 2005-2009 American Community Survey (ACS) 5-year estimates were not possible because the population data is not aggregated down to the Block Group level. Eleven of these fifteen block groups would be crossed by the proposed alignments. Further analysis of this information was conducted to establish Parish reference populations for comparative purposes in determining disproportionate project impacts. When possible, Parish reference populations consisted of only those Census Block Groups within the Study Area.

Table 4-4 presents the minority, low-income, and elderly populations potentially affected by all developed highway alignments compared to the appropriate reference population. The majority of Census Block Groups traversed by all alignments showed no indication of disproportionate impacts. The shaded cell in the table represents a value considered substantially different than the reference population values and identified Census

Block Groups where disproportionate impacts may occur. This area was examined in greater detail to determine the extent of any project impacts, positive or negative.

Bossier Parish Census Block Group 5 in Census Tract 111.06 was the only tract traversed by the proposed alignments with a substantially higher percentage of minorities (71%) when compared to the reference population (27%). A small cluster of homes and one business is located along Shootout Lane in the northeastern portion of Block Group 5 between the western border of the Louisiana Army Ammunition Plant, U.S. 80, and Clarke Bayou. These were identified and avoided during the alignment development process in order to preserve community cohesion.

4.3.2 Summary of Environmental Justice Considerations

No disproportionate impacts to minority, low-income, or elderly population groups would be expected by any of the alignments. During final design of the highway, further consideration will be given to reducing residential and business displacements. All displaced residents will be provided with relocation assistance by DOTD and every reasonable effort will be made to relocate affected residents within their immediate community.

Table 4-4 CENSUS BLOCK GROUPS POTENTIALLY AFFECTED BY THE ALIGNMENTS								
Parish	Census Tract	Census Block Group	Population	% Minority	% 65 and Older	Median Household Income	% Below Poverty	% Speaks Language other than English at Home and Speaks English Less than Very Well
Bossier	110	1	1,715	24	15	35,560	14	0
		2	851	22	10	48,802	20	1.5
		3	1,928	35	7	32,548	24	0
		4	2,121	6	6	55,781	4	0.5
	111.06	1	1,124	10	8	38,611	15	3.1
		4	3,317	24	9	33,542	16	0.7
		5	14	71	0	61,250	0	0
Bossier Parish Reference Population			11,070	27	8	43,728	13	1.9
Caddo	240	1	1,238	9	35	72,222	19	0
Caddo Parish Reference Population			1,238	9	35	72,222	19	1.1
DeSoto	9501	1	2,423	37	10	39,028	13	2.7
		2	1,646	19	12	37,679	15	0.1
		3	2,875	27	10	36,650	19	0.2
DeSoto Parish Reference Population			6,944	28	11	37,786	16	1.6

Source: U.S. Department of Commerce – Bureau of the Census – 2000 Census of Housing and Population

* Shading indicates values substantially different from the reference population.

4.4 ENGLISH PROFICIENCY

Executive Order 13166, *Improving Access to Services for persons with Limited English Proficiency (LEP)*, requires federal agencies to examine the services they provide and identify any need for services to those with limited English proficiency. The Executive Order requires federal agencies to work to ensure that recipients of federal financial-assistance provide meaningful access to their LEP applicants and beneficiaries. Failure to ensure that LEP persons can effectively

participate in or benefit from federally assisted programs and activities may violate the provision under Title VI of the Civil Rights Restoration Act of 1987 and Title VI regulations against national origin discrimination.

Year 2000 Census data for “Language Spoken at Home by Ability to Speak English” for the population five years of age and over indicates that between 0 and 3.1 percent of people within block groups transected by or adjacent to the proposed

alignments speak English less than “very well” (see Table 4-4). The LEP populations within the Study Area speak a variety of languages including Spanish, other Indo-European languages, and Asian and Pacific languages. Comparisons using the 2010 Census of Population and Housing or the 2005-2009 American Community Survey (ACS) 5-year estimates were not possible because the population data is not aggregated down to the Block Group level.

The Study Area is predominantly rural in nature with dense residential development limited to the towns of Houghton and Stonewall except for the northern portion that is bordered by the cities of Shreveport and Bossier City. No ethnic neighborhoods, business districts or billboards in non-English were observed during field studies.

The No-Action and Build alternatives would have no disproportionate impact on Limited English Proficiency populations.

4.5 ECONOMIC IMPACTS

Economic impacts related to the development of the Project include a temporary increase in construction employment, an increase in other employment areas, reduction in travel costs, and additional local and regional income generated from sources such as transportation related taxes. Economic impacts would be similar for all alignments, including the Selected Alignment.

4.5.1 Employment Opportunities

Construction of the proposed highway would positively impact the local economies of the Study Area communities. New employment opportunities would be generated by the construction activities, in addition to the services required to support the operation. A national FHWA study on employment impacts of highway investment (*Highway Infrastructure Investment and Job Generation: A Look at the Positive Employment Impacts of Highway Investment*, USDOT, FHWA, 1997) found that every \$1 billion in Federal-aid highway investment supported approximately 42,100 total full-time equivalent jobs. Jobs were further classified as:

- ❑ direct or on-site highway construction jobs specifically involved with the highway improvement project such as construction laborers, engineers, and construction managers
- ❑ indirect or supply industry jobs at firms that supply equipment, materials, and administrative support
- ❑ induced jobs created when construction-based employees spend their wages on various goods and services throughout the area.

An estimate of the number of jobs potentially created by the proposed highway is shown in Table 4-5.

Table 4-5
ESTIMATED EMPLOYMENT IMPACTS OF HIGHWAY CONSTRUCTION

Job Category (person-years)	Jobs Per \$1 Billion of Construction Costs ¹	No-Action	Build Alternatives
Average Construction Costs (Billions)		\$0.00	\$0.85
Direct/On-site Jobs	7,900	0	6,715
Indirect Jobs	19,700	0	16,745
Induced Jobs	14,500	0	12,325
Total Jobs	42,100	0	35,785

Source: Michael Baker Jr., Inc., FHWA

¹ Does not include Right-of-Way costs

Due to the similarity in estimated construction costs of all alignments, individual employment projections were not made for each alignment. Overall, over 35,000 indirect and induced jobs could be generated by construction of the proposed highway. Given the length of the proposed highway, these economic impacts would continue for several years.

Many Study Area residents would benefit from the proposed highway. Increased accessibility to the Interstate system would allow commuting times to be reduced from these rural communities allowing persons to increase their employment search area in a safer and more time efficient manner.

It is possible that some highway-related businesses along U.S. 171, LA 1, U.S. 71, and LA 157 could suffer due to a reduction in traffic on this route. This would depend on the type of business, the traffic changes that occur, and the proximity to other traffic generators. Highway related businesses that depend in large part on through traffic might be negatively impacted. Impacts to

these businesses would also be dependent on their proximity to proposed interchanges. Marketing initiatives by affected businesses, such as signs on the highway, may offset the loss of through traffic impacts.

The No-Action alternative could have a negative economic impact on the Study Area. The No-Action alternative would not result in new construction employment, could limit rural resident employment opportunities, and increase travel and vehicle operating costs through a decreasing level of service on area roadways.

4.5.2 Indirect Economic Impacts

Indirect economic impacts would be tied to potential indirect development throughout the Study Area. Growth in residential development in the communities of Stonewall, Elm Grove, and Haughton would increase the demand for consumer services, including retail, banking, healthcare and recreation.

Commercial development at interchanges at U.S. 171, LA 1, U.S. 71, and LA 157 would have varying economic effects on the local economy, depending on the extent of this development.

4.6 VISUAL

Visual changes that are attributable to the proposed highway would take two forms: views of the proposed highway from various points within the Preferred Corridor and views from the proposed highway of the surrounding landscape. All alignments would have similar visual impacts.

4.6.1 Views of the Proposed Highway

The proposed highway would alter both the urban and rural setting as it moves from Stonewall to Haughton. The landscape between these two communities is comprised by a mixture of forestland interspersed with limited residential development in upland areas, and agricultural land adjacent to the Red River floodplain. Residents not displaced by the highway facility, but in close proximity to it, would have the greatest visual impacts. However, the number of these incidences is low due to the forested nature of the surrounding environment. Other residents living in the flat terrain across the agricultural landscape of the Red River floodplain would be less affected by most views of the highway except in areas where elevated grade separations occur at area roadway crossings.

4.6.2 Views from the Proposed Highway

The views of the surrounding landscape from the proposed highway could be considered a beneficial impact as travelers pass through a predominantly rural vista marked by agricultural and adjacent forested lands. Numerous viewshed opportunities would exist, primarily at elevated grade separations, for motorist views across expansive agricultural lands, forested areas, and views of distant rural communities. Views of scenic wetlands would occur at the bridge crossing of the Red River.

4.7 OIL AND GAS RESOURCES

Producing oil and gas well locations were obtained from Tobin International, Ltd. in San Antonio, Texas and entered into the Geographic Information System (GIS) to determine impacts for each alignment during the Alignment Study phase. Prior to identifying a Selected Alignment, current oil and gas well locations were obtained from the Louisiana Department of Natural Resources SONRIS web site. Producing wells are defined as wells that are currently providing enough product to offset the cost of maintenance and extraction.

Oil and gas well impacts are summarized in Table 4-6. Well impacts are scattered throughout the Study Area from Stonewall to LA 157 in Bossier Parish, with most being located within the Elm Grove Field.

Table 4-6 PRODUCING OIL AND GAS WELL IMPACTS		
Alignment	Oil	Gas
No-Action	0	0
Line 1	0	15
Line 2	0	17
Line 3	0	7
Line 4	1	22
Line 5	0	18
Line 6 (DEIS Preferred)	0	9
Selected ¹	0	11
Frontage Road (Selected)	0	1

Source: Michael Baker Jr., Inc., SONRIS

¹ Selected Alignment is Line 6 with minor modifications

Line 4 is the only alternative that would impact a producing oil well and also impacts the greatest number of producing gas wells. Line 3 would impact the least number of producing gas wells. No Haynesville Shale wells are impacted.

The No-Action alternative would not impact any wells.

As a result of highway construction, economic impacts may occur to landowners due to the loss of active oil or gas wells. In conjunction with the property acquisition process, a qualified petroleum engineer would conduct a feasibility study for each impacted well to determine the estimated reserves. Results of the study would determine whether a well would be replaced by directional drilling or compensation would be provided to landowners based on estimated reserves. All wells impacted by the proposed highway would be properly abandoned according to procedures established by

the Louisiana Department of Environmental Quality. During final design of the highway, individual gas and oil collector lines would be identified. When possible, these lines would be avoided or relocated to continue service to these well sites.

4.8 WATER QUALITY

Potential water quality impacts were assessed for surface water, groundwater, and public water supplies. DOTD will comply with all requirements of the Clean Water Act, as amended, for the construction of this proposed highway, and will obtain the following permits: a Section 401 Water Quality Certification, a Section 402 National Pollutant Discharge Elimination System (NPDES) Permit, and a Louisiana Water Discharge Permit System (LWDPS) permit issued by the Louisiana Department of Environmental Quality (LADEQ); and a Section 404 permit issued by the U.S. Army Corps of Engineers for the placement of dredged and fill material in waters of the United States. A Stormwater Pollution Prevention Plan will be prepared in conjunction with the NPDES permitting process prior to construction. This plan will include all specifications and best management practices (BMPs) necessary for control of erosion and sedimentation due to construction related activities.

The No-Action alternative would have limited impacts to all water resources. Normal roadway maintenance, and minor safety improvements may

result in the temporary influx of sediment-laden runoff to area waters.

4.8.1 Surface Water Resources

Surface water resources crossed by all alignments include perennial and intermittent streams or bayous, and man-made ponds primarily associated with agricultural activities. Perennial streams crossed by the alignments include Brushy Bayou, Wallace Bayou, Chico Bayou, Bayou Pierre, Red Chute Bayou, Foxskin Bayou, and Clarke Bayou. Intermittent streams crossed by all alignments include Frierson Branch and Gandy Bayou. Additionally, all alignments would cross the Red River and the Flat River. Stream resources are shown in Exhibit 4-1.

Water quality impacts would be similar for all alignments and likely be restricted to the temporary influx of sediment laden surface runoff associated culvert and bridge placements. No long-term adverse impacts would be expected.

Proposed Bridge and Culvert Locations

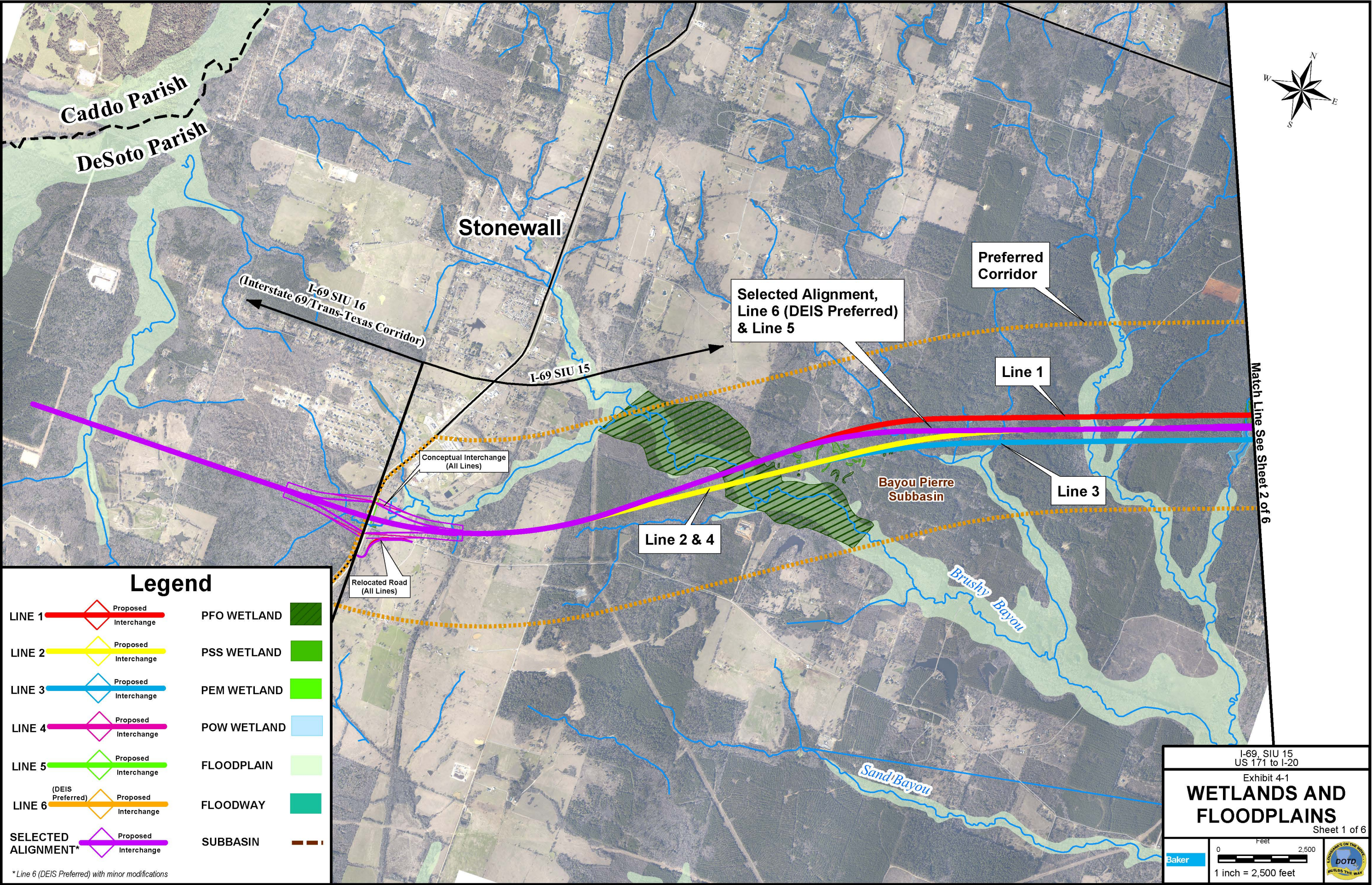
Bridges or culverts are proposed at the various surface water crossings depending on the roadway alignment and the upstream watershed area. Table 4-7 lists the major watercourses crossed and crossing type for each alignment. Culverts will most likely be used to cross other minor watercourses. Detailed hydraulic studies will be performed during the final design of the Project (see Section 4.9.5).

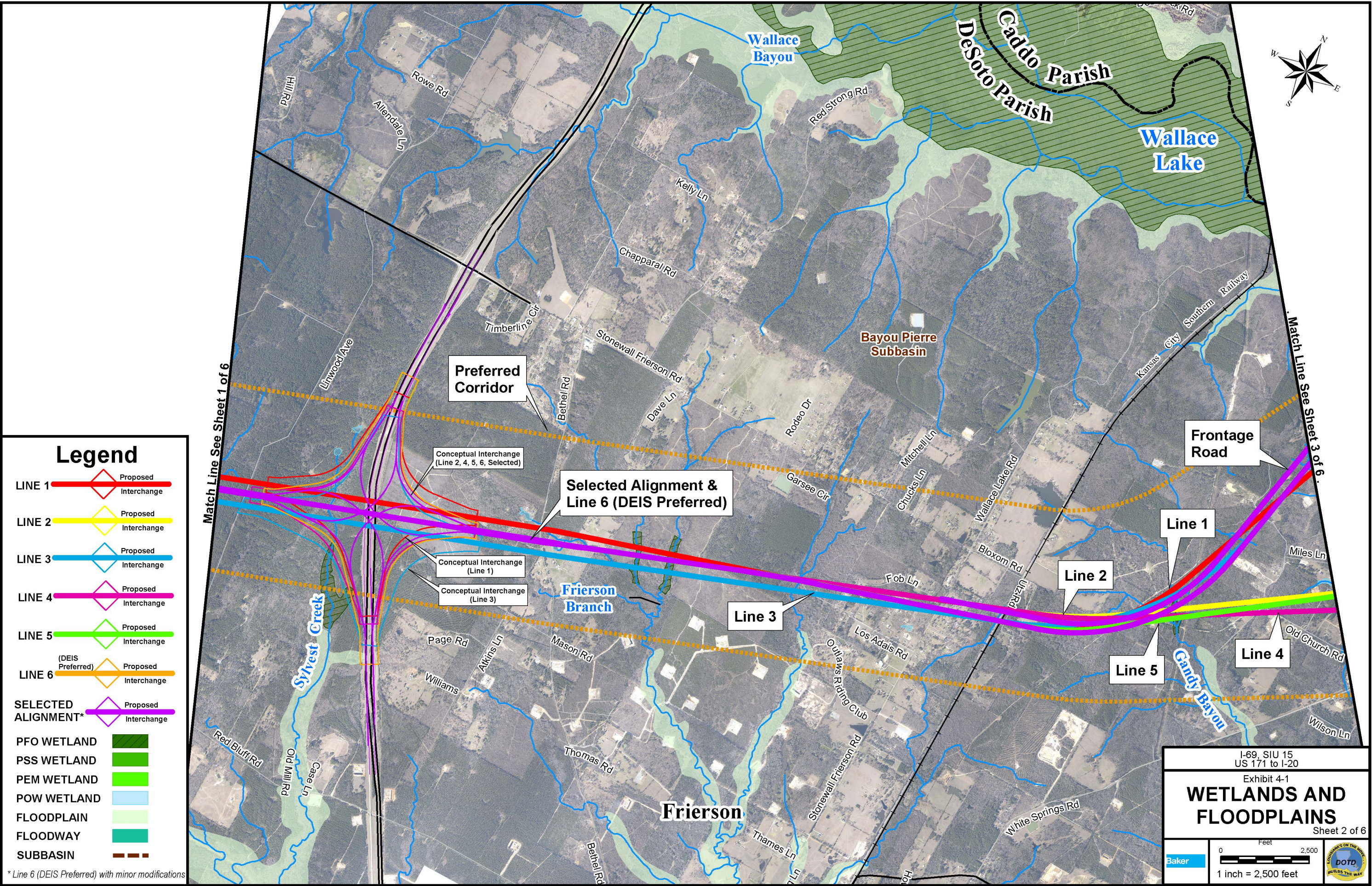
**Table 4-7
PROPOSED BRIDGE AND CULVERT LOCATIONS**

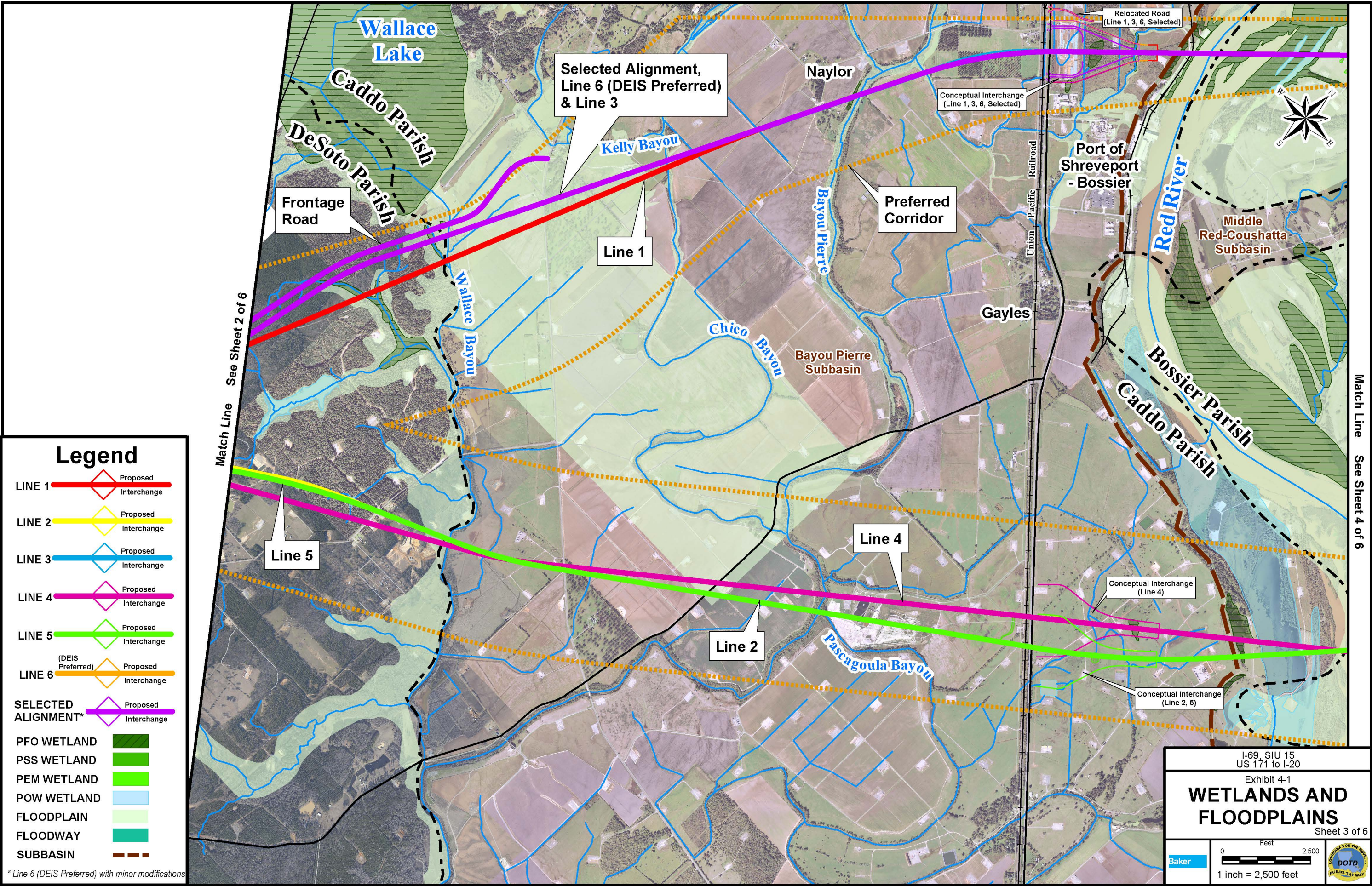
Watercourse	Alignment						
	Line 1	Line 2	Line 3	Line 4	Line 5	Line 6 (DEIS Preferred) / Selected ¹	Frontage Road (Selected)
Brushy Bayou	Culvert	Culvert	Culvert	Culvert	Culvert	Culvert	-
Frierson Branch	Culvert	Culvert	Culvert	Culvert	Culvert	Culvert	-
Gandy Bayou	Culvert	Culvert	Culvert	Culvert	Culvert	Culvert	Culvert
Wallace Bayou	Bridge	Bridge	Bridge	Bridge	Bridge	Bridge	Bridge
Chico Bayou	Bridge	-	Bridge	-	-	Bridge	-
Bayou Pierre	Bridge	Bridge	Bridge	Bridge	Bridge	Bridge	-
Red River	Bridge	Bridge	Bridge	Bridge	Bridge	Bridge	-
Flat River	Bridge	Bridge	Bridge	Bridge	Bridge	Bridge	-
Red Chute Bayou	Bridge	Bridge	Bridge	Bridge	Bridge	Bridge	-
Foxskin Bayou	Bridge	Bridge	Bridge	Bridge	Bridge	Bridge	-
Clarke Bayou	Bridge	Bridge	Bridge	Bridge	Bridge	Bridge	-

Source: Michael Baker Jr., Inc.

¹ Selected Alignment is Line 6 with minor modifications







Legend

LINE 1

Proposed Interchange

LINE 2

Proposed Interchange

LINE 3

Proposed Interchange

LINE 4

Proposed Interchange

LINE 5

Proposed Interchange

LINE 6

(DEIS Preferred)

Proposed Interchange

SELECTED ALIGNMENT*

Proposed Interchange

PFO WETLAND

PSS WETLAND

PEM WETLAND

POW WETLAND

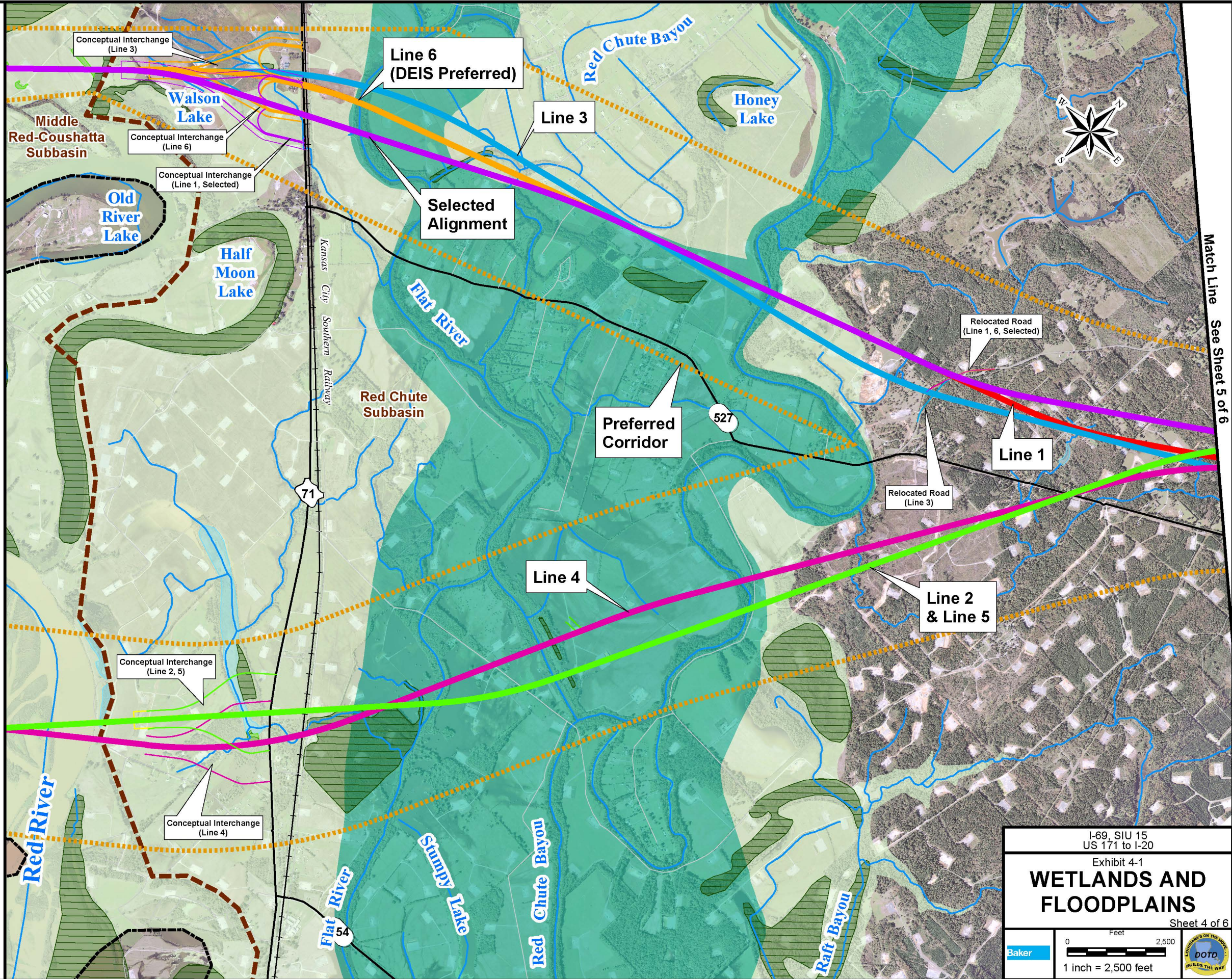
FLOODPLAIN

FLOODWAY

SUBBASIN

* Line 6 (DEIS Preferred) with minor modifications

Match Line See Sheet 3 of 6



I-69, SIU 15
US 171 to I-20

Exhibit 4-1

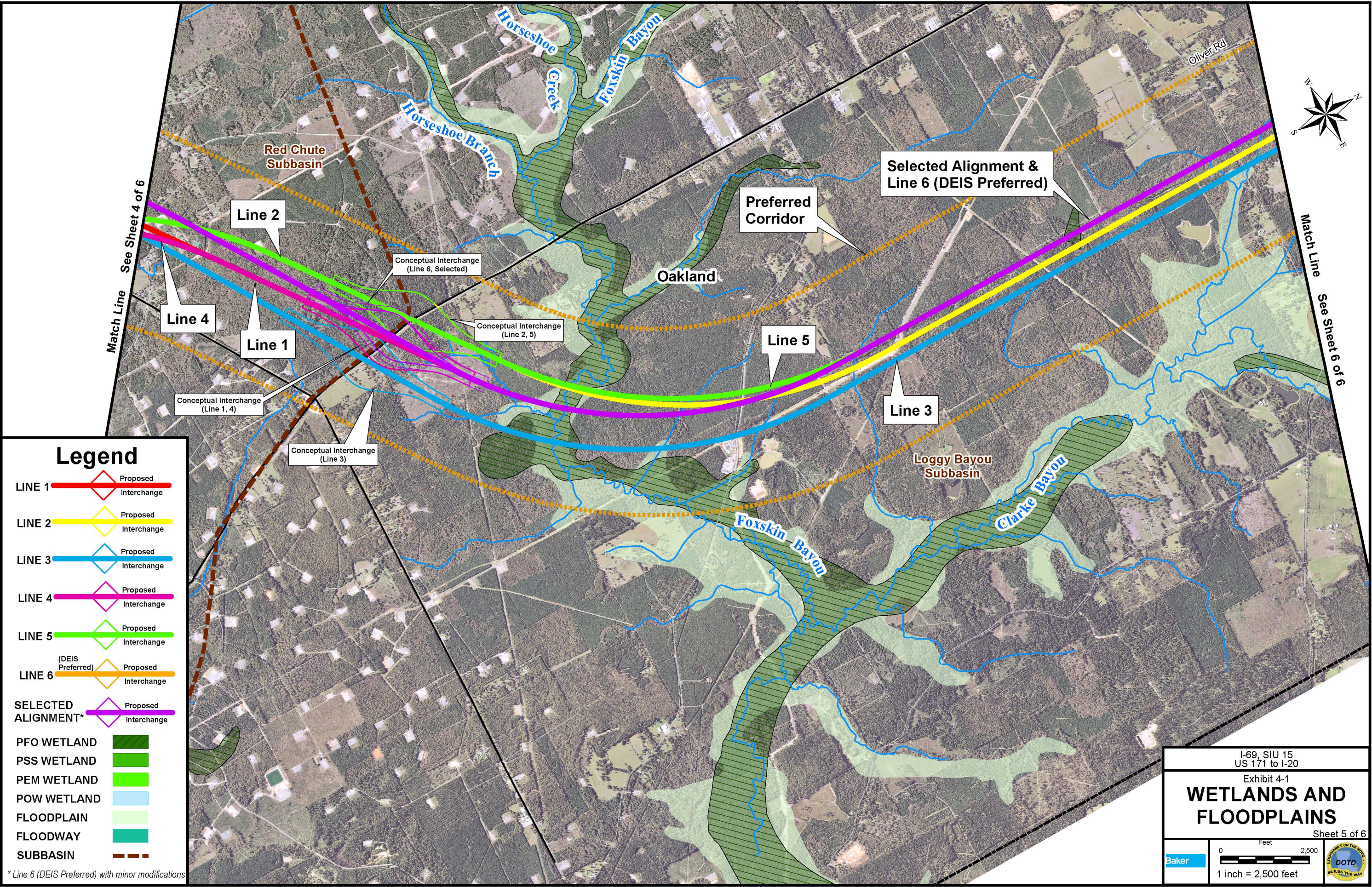
WETLANDS AND FLOODPLAINS

Sheet 4 of 6

Baker

0 2,500

1 inch = 2,500 feet



Legend

LINE 1		Proposed Interchange
LINE 2		Proposed Interchange
LINE 3		Proposed Interchange
LINE 4		Proposed Interchange
LINE 5		Proposed Interchange
LINE 6		Proposed Interchange
SELECTED ALIGNMENT*		Proposed Interchange
PFO WETLAND		
PSS WETLAND		
PEM WETLAND		
POW WETLAND		
FLOODPLAIN		
FLOODWAY		
SUBBASIN		

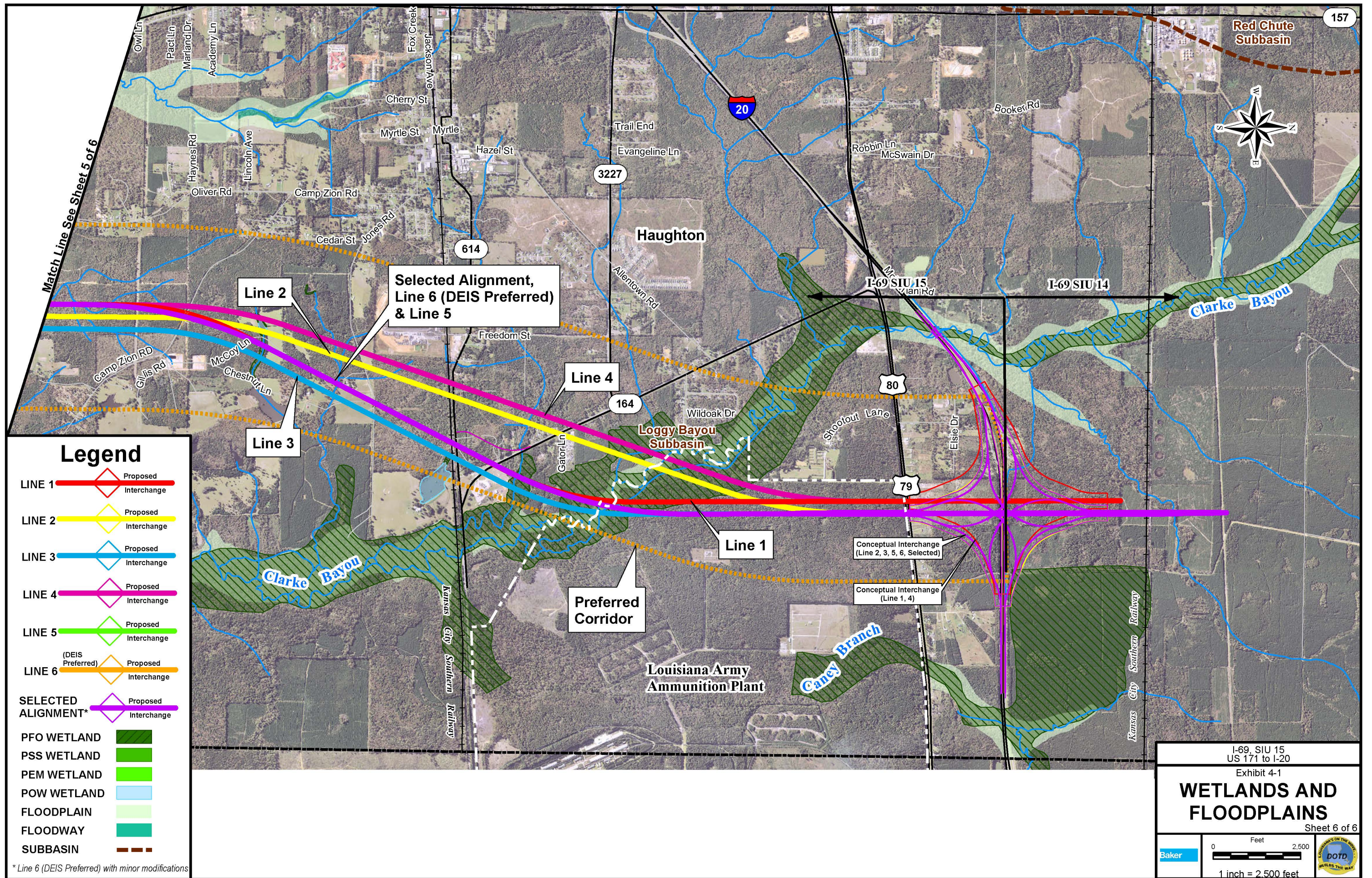
* Line 6 (DEIS Preferred) with minor modifications

I-69, SIU 15
US 171 to I-20

Exhibit 4-1
WETLANDS AND FLOODPLAINS

Sheet 5 of 6

1 inch = 2,500 feet



Construction Impacts

In general, construction activities would include removal of existing vegetation during clearing and grubbing that would expose soils adjacent to bayou crossings and within the right-of-way limits. As a result, a temporary increase in stream sedimentation could occur due to stormwater runoff and would be greatest in the immediate vicinity of the crossings.

Suspended solids could adversely impact both aquatic invertebrates (aquatic insects, mussels, zooplankton) and fishes by altering the existing substrate, reducing light penetration and in-stream photosynthesis, reducing dissolved oxygen, and increasing biological oxygen demand within the water column. Elevated suspended sediment concentrations could cause mortality in adult fish by clogging the gill filaments and preventing normal water circulation and aeration of blood. In addition, excess sedimentation could disrupt species productivity by smothering spawning areas, reducing egg viability, and preventing the emergence of fry.

Potential construction impacts to surface water quality would be non-alignment specific and could occur regardless of the alternative selected. All alignments would cross the same soils types and associated slopes adjacent to impacted streams. The substrate within stream segments crossed is nearly identical from location to location. Impacts from any of the alignments would be temporary in

nature and would be minimized through site specific erosion and sedimentation control measures at all stream or bayou crossings.

Indirect or Operational Impacts

The operation and maintenance of a highway would produce additional sources of surface water pollutants. During highway operation, sources of potential pollutants include vehicles (heavy metals such as copper, lead, and zinc from tire and brake wear, motor oil additives, and vehicle rust) and roadway maintenance practices such as sanding, deicing, and application of herbicides on right-of-way. However, the mild winter climate throughout the Study Area would limit the use of deicing materials and herbicides have not been found to be significant pollutants in highway runoff (Maestri et. al., 1988).

The rate of deposition and the subsequent magnitude of these pollutants in highway runoff are site-specific and are affected by traffic volumes, highway design, maintenance activities, surrounding land use, climate, and accidental spills.

The primary mechanism for removal of highway pollutants from the road surface is through stormwater runoff. Highway construction would increase the impervious surface in the watershed and would generate additional runoff to receiving streams. The affects of highway runoff on streams are variable and dependent on the length of time since the last storm event, the quantity of

stormwater runoff delivered to the stream, volume of flow in the stream, the duration of the storm event, and traffic volume (Barrett et al. 1993). Highway runoff may adversely affect the water quality through short-term loadings associated with storm events and through chronic effects as a result of long-term accumulation and exposure.

Research indicates that runoff from rural highways would generate few substantial impacts with average daily traffic (ADT) of less than 30,000 vehicles and that toxic effects are limited to urban facilities with ADT's exceeding 50,000 vehicles per day (Maestri et al. 1988). Based on the predicted ADT ranging from 9,900 to 25,100 for the proposed highway, no substantial impacts to water quality would be expected due to highway runoff.

Hazardous or Toxic Spills

The potential for a single event pollution discharge into the receiving waters during construction or operation of the proposed highway could impact area streams. In the event of a spill, all releases must be reported to the Emergency Response Commission through the Transportation and Environmental Safety section of the State Police using the Hazardous Materials Hotline. Depending on the nature of the material and location of the spill, other agencies such as the LADEQ may need to be notified.

Stormwater Runoff

Avoidance of crossing surface water resources is not possible within the Study Area. The developed highway alignments run roughly west to east while the existing drainage patterns run mainly north to south. The following mitigation measures would be implemented as part of the design and construction of this project to reduce impacts resulting from stormwater runoff. These measures would include:

- ❑ Implementation of a LADEQ approved Erosion and Sedimentation Control Plan
- ❑ Use of properly sized and engineered culverts for stream crossings to minimize impacts attributed to flood height and flood duration
- ❑ Construction of detention treatment facilities where necessary
- ❑ Perpendicular stream crossings where practicable
- ❑ Scheduling construction activities to minimize exposed areas and duration of exposure
- ❑ Prompt re-vegetation of all disturbed areas
- ❑ Minimize duration of in-stream work by heavy equipment
- ❑ Control of runoff within the right-of-way limits using temporary stormwater management ponds before discharging into receiving streams
- ❑ Use of gentle slopes and wide shallow channels for grassed swales to remove

pollutants through filtration, settling, and infiltration

- ❑ Designation of impervious areas for construction equipment, vehicle storage, and fuel to minimize accidental spills.

4.8.2 Groundwater Resources

The construction of the proposed highway and subsequent stormwater runoff would have minimal impacts on groundwater quality. Construction would increase the amount of impervious cover within the local watersheds, which would reduce the amount of infiltration to recharge underlying aquifers. However, because of the remaining amount of undeveloped land available for groundwater recharge, the change in land use associated with the proposed project would have a negligible effect on recharge.

Highway stormwater runoff could provide a potential source of pollutants to the groundwater system. However, through the implementation of a properly designed erosion and sedimentation control plan, minimal impact to groundwater resources would be anticipated.

The No-Action alternative would not impact groundwater resources.

4.8.3 Public Water Supply

All Lines, except Line 3, cross three Wellhead Protection Areas (WHPA) designated for the Town of Haughton water supply system while Line 3 crosses two. Additionally, all Lines would cross a

WHPA designated for the Village Water System at the interchange at I-20. The Village Water System provides a water supply for residents that live along U.S. 80. Avoidance of these WHPA's is not possible at this location due to the narrow corridor between the community of Haughton to the west and the Louisiana Army Ammunition Plant to the east. Potential impacts would be minimized during construction activities by storing fuels, other similar materials, and construction vehicles and equipment away from the WHPA.

The No-Action alternative would not impact public water supplies.

4.9 FLOODPLAINS

A floodplain evaluation was conducted in accordance with EO 11988, "Floodplain Management", 23 CFR 650, Subpart A, "Location and Hydraulic Design of Encroachments on Floodplains", and US DOT 5650.2, "Floodplain Management and Protection". The location of 100-year floodplains and floodways for creeks and bayous throughout the Study Area are shown on Exhibit 4-1. The floodplain and floodway locations were updated using FEMA Digital Flood Elevation Rate Map (DFIRM) data prior to identifying the Selected Alignment.

4.9.1 Floodplain Impacts

Table 4-8 presents a comparison of floodplain impacts by alignment. The Selected Alignment would have the greatest impact on floodplains,

while Line 5 would have the least. The greatest floodplain impacts would be associated with Red River and would be similar for all alignments. All alignments would have similar smaller floodplain impacts associated with perennial and intermittent stream crossings.

**Table 4-8
FLOODPLAIN AND FLOODWAY IMPACTS**

Alignment	Floodplain (acres)	Floodway (acres)
No-Action	0	0
Line 1	151.6	44.5
Line 2	140.7	58.4
Line 3	147.9	39.2
Line 4	152.7	60.2
Line 5	138.8	58.4
Line 6 (DEIS Preferred)	149.9	44.6
Selected ¹	176.7	49.8
Frontage Road (Selected)	16.2	0

Source: Michael Baker Jr., Inc.

¹ Selected Alignment is Line 6 with minor modifications

The No-Action alternative could result in future floodplain impacts as minor safety improvements and additional widening or passing lane projects are implemented within the Study Area. All future projects will include measures to minimize floodplain impacts to the extent possible.

4.9.2 Floodway Impacts

Table 4-8 presents a comparison of floodway impacts by alignment. All alignments would cross floodways associated with Red Chute Bayou. The expansive floodway to the north and south of Line 2, Line 4, and Line 5 makes avoidance

impracticable. Line 1, Line 3, Line 6 (DEIS Preferred Alignment), and the Selected Alignment cross the floodway between LA 527 and Caplis-Sligo Road. For these Lines, avoidance to the south was not practicable due to the expansive floodway, and although alignments further north would result in crossing two smaller floodways associated with Red Chute Bayou, additional residential impacts and loss of access would occur.

The Red River Bridge conceptual study (see Section 2.5.3) included a preliminary hydrologic and hydraulic study to determine the impacts to the 100-year water surface elevation and effects to backwater from preliminary main and approach span spacing, and pier sizes. For the 1-percent chance flood event, the surface water elevation would increase 0.03 feet (0.36 inches) immediately upstream of the bridge.

Detailed hydrologic and hydraulic studies would be performed during final design to demonstrate that proposed encroachments would not result in any increase in flood level due to construction that would violate applicable floodplain regulations, including National Flood Insurance Program Regulations and Bossier, Caddo and DeSoto Parishes Flood Ordinances.

Drainage structures would be sized and additional floodwater storage created to ensure that these structures have sufficient capacity to eliminate upstream and downstream impacts and maintain

flow values, floodplain and floodway elevations and floodway widths in accordance with applicable floodplain regulations.

Net floodwater storage volume within the floodplain would not be decreased. Possible measures include utilizing embankment and other materials from within the floodplain and using borrow pits to maintain floodwater storage volumes. Hydraulic design and construction practices would be in accordance with current DOTD and FHWA design policies and standards, and would allow for occurrence of a base flood inundation, accumulation, and flow of floodwater. Engineering “No Rise” Certificates would be prepared as part of the final design of the Project.

4.9.3 Indirect Floodplain Impacts

Interchanges within floodplains were analyzed for potential indirect development that could promote incompatible floodplain development. Floodplains involved were associated with Brushy Bayou and Red River. Interchange locations are shown on Exhibit 4-1.

All alignments have an interchange proposed at U.S. 171 that would encroach upon the floodplain of Brushy Bayou. Sufficient undeveloped land exists to the west of U.S. 171 outside the floodplain area that could support indirect development.

Lines 1, 3, 6 (DEIS Preferred Alignment) and the Selected Alignment would have an interchange proposed at U.S. 71 that would encroach upon the

floodplain of the Red River. Indirect floodplain impacts due to interchange development could occur at this location.

Lines 2, 4, and 5 would have an interchange proposed at U.S. 71 slightly north of Old Field Road. Indirect floodplain impacts due to interchange development could occur at this location.

4.9.4 Floodplains Finding

The Study Area is bisected by floodplains associated with the Red River Alluvial Valley. Consequently, there is no practicable alternative to the proposed construction of the Selected Alignment that does not cross floodplains or floodways. The Selected Alignment includes all practicable measures to minimize floodplain impacts. A detailed floodplain evaluation will be conducted during the final design phase of the project in accordance with Executive Order 11988 and 23 CFR 650, Subpart A.

4.9.5 Floodplain and Floodway Mitigation

Detailed hydraulic studies will be performed during the final design of the Project to determine any changes in flood elevations due to construction. The DOTD Hydraulics Manual (DOTD 1987), requires a 50-year design frequency and geometric design standards require the finished roadway elevation be above the calculated water surface for the design frequency event.

DOTD and FHWA will review these studies to confirm that adequate measures have been taken to insure that floodplain encroachment does not increase the risk of flooding to adjacent properties. These studies, along with applicable Engineering "No Rise" Certificates, will be submitted to the Parish Floodplain Administrators for review and approval. The No-Action alternative would have no impact on floodplains or floodways.

4.10 WETLANDS

4.10.1 Methodology

Potential wetland systems were initially identified using color infrared aerial photography and U.S. Department of Agriculture Soils Survey mapping. Identified wetlands were entered into the Project GIS as part of the environmental inventory conducted during the Corridor Study phase of the project. This information was overlaid on USDA soils mapping and project aerial photography to aide in field verification of potential wetland impacts.

All wetlands identified within the Preferred Corridor were evaluated in accordance with Executive Order 11990 entitled "Protection of Wetlands". Due to the relative number and spatial distribution patterns of wetland communities, as well as a thorough consideration of other environmental concerns including existing topography, residential structures and communities, a practicable alignment that avoids all wetlands is not possible within the Preferred Corridor. However, throughout

the development of all alignments, wetland impacts were minimized to the greatest extent possible.

Prior to the wetland field investigation, Vicksburg District COE regulatory and enforcement personnel were contacted to discuss important considerations regarding hydric soils within the Red River floodplain. Any areas exhibiting hydric vegetation and positive hydrological indicators but having red parent material soils would be reviewed with appropriate COE personnel prior to confirming wetland status.

The NRCS offices in Caddo, Bossier and DeSoto parishes were contacted to obtain information on farmed and prior converted wetlands. Information on farmed wetlands was not available as recent enforcement of existing privacy laws prevents this information from being distributed to the public. However, based on the wetlands field study, the only areas of concern would be between U.S. 71 and the Red River and LA 1 and Wallace Bayou. A review of historic aerial photography indicates that these farm tracts were in agricultural use prior to 1980 and would be considered prior converted if positive wetland conditions were once present.

Using the information as described above, wetlands within the Preferred Corridor were field verified in 2003 and 2007 (where reasonably accessible and where property owner permission was granted) using methods outlined in the COE Wetlands Delineation Manual (COE Manual,

January 1987). Where access was limited, verification of wetlands was based on aerial photography and soil survey information. The COE has been involved at all stages of the project development. Wetland delineation methodology and boundary determinations were reviewed and approved by the COE during a July 19, 2003 field review. Principle functions and values such as floodflow alteration, wildlife habitat, and recreational value were identified and assessed for each wetland system.

A Wetlands and Surface Waters report was submitted for COE review on October 6, 2011. On February 23, 2012, the COE issued a Preliminary Jurisdictional Determination (JD) for the Selected Alignment (see Appendix N). A draft Section 404 permit application for the Selected Alignment is included in the Final Environmental Impact Statement Appendix O.

Continuing coordination between the COE and the DOTD will insure that all regulatory concerns are addressed. During the final design process continued efforts will be made to further avoid and/or minimize wetland impacts through consideration of design alternatives.

4.10.2 Wetland Impacts and Alternatives Analysis

Wetland impacts are presented in Table 4-9 and are shown on Exhibit 4-1 for impacts occurring within each alignment's construction limits. Because of the spatial distribution and linear nature

of many wetland systems as well as consideration of other environmental concerns such as topography, residential structures, and communities a practical alignment that avoids all wetlands is not possible for any alignment.

Table 4-9 TOTAL WETLAND IMPACTS BY HABITAT TYPE				
Alignment	Forested (ac)	Scrub/Shrub (ac)	Emergent (ac)	Total (ac)
No-Action	0	0	0	0
Line 1	49.9	2.0	0.2	52.1
Line 2	42.9	3.4	1.7	48.0
Line 3	53.5	2.0	0.2	55.7
Line 4	53.9	3.2	1.1	58.2
Line 5	42.0	2.9	1.8	46.7
Line 6 (DEIS Preferred)	42.0	1.6	0.2	43.8
Selected ¹	41.4	1.4	0.2	43.0
Frontage Road (Selected)	0.4	0.3	0	0.7

Source: Michael Baker Jr., Inc.

¹ Selected Alignment is Line 6 with minor modifications

All alignments would impact similar wetland resources except within the Red River floodplain generally located between Wallace Bayou and Red Chute Bayou. Line 4 would have the greatest wetland impacts (58.2 ac) while the Selected Alignment would have the least impacts (43.0 ac). The majority of wetland impacts would be to palustrine forested wetlands (PFO) adjacent to area streams and bayous while some impacts occur to palustrine scrub-shrub (PSS) and palustrine emergent (PEM) systems. Early wetland identification allowed for avoidance and minimization of impacts of major wetland sites very early in the alignment development process. This approach limited impacts primarily to linear wetland

systems that could not be avoided by any alternative.

Wetland Impacts by Subbasin

All alignments are located within four subbasins as defined by the U.S. Geologic Survey, Bayou Pierre,

Middle Red-Coushatta, Red Chute and Loggy Bayou. Table 4-10 presents the wetland impacts within each subbasin.

Table 4-10 WETLAND IMPACTS BY SUBBASIN					
Alignment	Bayou Pierre (ac)	Middle Red - Coushatta (ac)	Red Chute (ac)	Loggy Bayou (ac)	Total (ac)
No-Action	0	0	0	0	0
Line 1	19.4	0	1.7	31.0	52.1
Line 2	15.6	0	11.6	20.9	48.1
Line 3	24.6	0	0.9	30.1	55.6
Line 4	16.9	0	14.6	26.7	58.2
Line 5	12.7	0	11.6	22.4	46.7
Line 6 (DEIS Preferred)	19.8	0	1.7	22.3	43.8
Selected ¹	19.8	0	0.9	22.3	43.0
Frontage Road (Selected)	0.7	0	0	0	0.7

Source: Michael Baker Jr., Inc.

¹ Selected Alignment is Line 6 with minor modifications

The Bayou Pierre subbasin includes Brushy Bayou, Wallace Bayou, Chico Bayou, Bayou Pierre, Frierson Branch, and Gandy Bayou. The Red Chute subbasin includes the Flat River and Red Chute Bayou. The Loggy Bayou subbasin includes Foxskin Bayou and Clarke Bayou. The Middle Red-Coushatta subbasin includes the Red River. There are no wetland impacts associated with the Middle Red-Coushatta subbasin because the bridge over the Red River will span from levee to levee to reduce impacts from fill material to the

wetlands and floodplains associated with the river system.

Construction related impacts could include erosion and sediment deposition, and altering water regimes and water quality. The majority of these impacts are temporary in nature and their severity would be mitigated during construction through implementation of the following:

- ☐ Wetlands outside the construction limits will not be used for construction support activities (borrow sites, waste sites, storage, parking

access, etc.) unless the contractor obtains Section 404 permits from the Corps of Engineers

- ❑ Clearing of wetland vegetation will be limited to the minimum required for job completion
- ❑ Coordination with the contractor to ensure that all appropriate measures will be taken to protect the water quality of adjacent wetlands through the use of straw bales, silt fencing, and seeding and mulching.

Wetland impacts could also result from the relocation of utilities (electric, gas, water and sewage transmission lines) and oil and gas wells. These issues were considered during the alignment development process. The proposed highway has been developed on new location and as such, involvement with major utilities has been minimized.

The No-Action alternative would not impact area wetlands.

4.10.3 Indirect Wetland Impacts

Indirect development at interchange locations could result in additional wetland impacts. A review of wetlands adjacent to these interchanges and the connecting roadway indicates that there is potential for additional wetland impacts created by indirect development near the I-49 interchange. At this location there are forested wetland systems associated with Sylvest Creek with dominant trees being water oak, black gum and green ash.

Sylvest Creek and the associated wetlands are located generally more than 400 feet from existing I-49 but could be impacted by future development. However, it should be noted that there are significant areas of uplands adjacent to this wetland system that are closer to I-49 and would be better building sites and require less permitting and are therefore more desirable locations for development.

Studies have found that the majority of interchange development occurs within 0.5 miles of the interchange (Hartgen and Kim 1998). With the exception of the I-49 interchange, no wetlands occur along existing roadway within 0.5 miles of the proposed interchanges, and sufficient upland areas exist to accommodate potential indirect development. Development and subsequent impacts of any wetlands would be under the jurisdiction of the COE and other permitting agencies and as such, would require an Alternatives Analysis documenting avoidance and minimization efforts and a mitigation plan if appropriate.

4.10.4 Wetlands Finding

Based on the above analyses, it is determined that there is no practicable alternative to the proposed construction of the Selected Alignment in wetlands. The location of the Selected Alignment includes all practicable measures to minimize harm to wetlands as specified in Executive Order 11990.

4.10.5 Wetland Mitigation

Wetland area lost due to construction of the proposed highway would be replaced through mitigation activities. Mitigation includes measures which avoid, minimize, and/or compensate for unavoidable losses to resources that cannot be further minimized. The assessment of mitigation measures (avoidance, minimization, and compensation) is an integral part of the NEPA/Section 404 Process. For those impacts that cannot be avoided, other mitigation efforts must be considered. These efforts include minimization of potentially adverse impacts and compensation for those remaining adverse impacts that cannot be further reduced. Coordination with the COE is ongoing. Wetland Areas classified as jurisdictional by the COE would be replaced at a ratio to be determined by application of an appropriate assessment methodology for

compensatory mitigation. Final mitigation ratios and requirements will be determined during an evaluation of the project pursuant to Section 404 of the Clean Water Act. This evaluation process will take place after issuance of the Record of Decision.

4.11 NATURAL COMMUNITIES

Impacts to terrestrial and aquatic communities would primarily result from the conversion of existing land to highway right-of-way (see Table 4-11). Land conversion impacts for each alignment were assessed using color infrared aerial photography and GIS to determine the extent of impact to five broad natural communities. These communities are described in Section 3.

Impacts are based on the area within each alignment's construction limits. Wetland community impacts are described in detail in Section 4.10.

Alignment	Pine Forest (ac)	Pine/Oak Forest (ac)	Bottomland Hardwoods (ac)	Pasture/Cropland (ac)	Wetlands (ac)
No-Action	0	0	0	0	0
Line 1	729.6	364.6	59.0	501.0	52.1
Line 2	726.9	302.6	73.0	488.2	48.0
Line 3	704.2	381.3	58.8	524.1	55.6
Line 4	780.0	300.0	50.7	464.0	58.2
Line 5	838.0	266.8	33.3	479.2	46.7
Line 6 (DEIS Preferred)	784.2	343.3	62.0	487.3	43.8
Selected ¹	784.2	343.3	62.0	475.1	43.0
Frontage Road (Selected)	39.7	17.5	3.0	12.5	0.7

Source: Michael Baker Jr., Inc.

¹ Selected Alignment is Line 6 with minor modifications

Impacts are generally similar for all Lines. The pasture/cropland and pine forest would be the community types most affected by all alignments. This is consistent with the dominant vegetation found throughout the Study Area.

Line 3 would impact the greatest amount of pasture and cropland while Line 5 would impact the greatest amount of pine forest.

Aquatic community impacts would be limited to the conversion and filling of several isolated ponds, primarily used for cattle production, and increased levels of sedimentation at stream crossing areas during construction. Increased sedimentation could adversely impact both aquatic invertebrates and fishes and cause temporary habitat degradation for a number of species.

No terrestrial or aquatic species populations would be eliminated due to construction of any of the alignments. Some individual species mortality would occur to less mobile species, such as reptiles and amphibians, during initial construction activities. Construction of the alignments would convert existing habitat communities to early successional grassy or shrubby vegetation commonly associated with highway right-of-way. Potential wildlife impacts would likely follow those observed on other similar existing highways. Researchers have found that construction and operation of highways does not adversely affect the distribution and abundance of the majority of bird

and mammal species, including game species (Michael 1975; Burke and Sherburne 1982; Adams and Geis 1982).

Many wildlife species would be able to utilize the new habitat created by the right-of-way and its associated edge and could be used by a variety of wildlife species including cottontail rabbits, white-tailed deer, red fox, coyotes, a variety of small mammals, and a number of bird species. The above researchers found that while species composition changed along the newly formed edge habitat, species adapted to more remote forested environments continued to use the adjacent forest community.

No community types would be extensively impacted based on their overall availability within the Study Area. Wildlife species that are unable to adapt to the limited right-of-way environment, could relocate to suitable surrounding habitats. However, most species found within the Study Area display a broad habitat distribution and are not restricted to any particular habitat types.

The No-Action alternative would have minimal impacts on terrestrial and aquatic communities.

Indirect Impacts

The most visible effect of roads on wildlife is animal mortality resulting from collisions with motor vehicles. For most wildlife species, the death of a few individuals does not directly impact the overall survival of the species throughout its range. In

general, most wildlife species found within the Study Area are broadly distributed across Northwest Louisiana. It is unlikely that highway mortality would pose a serious threat to the continued existence of any of these species. Several highway related wildlife mortality studies have concluded that roads appeared to act in a density-dependent manner. Species killed in greatest numbers were those with high population densities attracted to right-of-way habitat, such as edge-associated birds and small/medium sized mammals (Adams and Geis 1982; Michael 1975).

4.12 THREATENED AND ENDANGERED SPECIES

Coordination with the FWS and the LNHP has occurred throughout the project development process with respect to the location of and potential habitat for the endangered Interior least tern (ILT) (*Sterna antillarum*) and Red-cockaded woodpecker (RCW) (*Picoides borealis*). The Preferred Corridor avoided involvement with previously recorded locations of these known species.

At a January 25, 2005 meeting, the DOTD, the FHWA, and the FWS agreed that potential habitat surveys for these endangered species would be conducted and that the Endangered Species Act (ESA) Section 7 consultations with the FWS would be completed prior to the issuance of the Final Environmental Impact Statement. The conducted surveys and completed ESA Section 7

consultation are discussed in Sections 4.12.1 and 4.12.2.

4.12.1 Interior Least Tern Biological Assessment

A Biological Assessment (BA) was conducted to determine the potential impacts to the ILT nesting habitat at the two proposed Red River crossings identified in the Draft EIS.

Research has shown that ILT nesting colonies usually locate on sparsely vegetated sand and gravel bars within a wide unobstructed river channel, usually at higher elevations and away from the water's edge (FWS 1990). Previous research also indicated that islands in the Lock and Dam No. 5 pool, south of Shreveport, are much less suitable for nesting, due to the lack of beneficial spring flooding and scouring action by high waters (Hervey 2001).

On August 9, 2005, a river survey was conducted 1,500 feet upstream and downstream at the two river crossings. River levels at the time of the survey were within suitable levels. No Interior least terns, nests, nor suitable nesting habitat were observed in the survey areas. A field view was conducted with FWS personnel on August 17, 2006, confirming the initial survey findings.

In addition, COE bathymetric and 1980 through 2003 daily river stages was evaluated to determine the probability of isolated sandbars and

sand or gravel islands becoming exposed during the nesting season and remaining exposed throughout the incubation/fledging cycle. The analysis indicated a low probability of sand or gravel islands forming, and any that might form would be at the water's edge, which is a much less suitable for nesting.

The FHWA determined that the project “may affect, but is not likely to adversely affect” the species. In their November 14, 2006 letter (see Appendix D, page D-132), the FWS concurred with FHWA's determination and indicated that no further ESA Section 7 consultation would be required unless there were changes in the scope or location of the project, or construction was not initiated within one year.

In their September 15, 2010 letter (see Appendix D, page D-166), the FWS reaffirmed that the project was not likely to adversely affect threatened and endangered species and no further consultation was necessary unless there were changes in the project's scope or location, or if project construction has not been initiated within one year. If the project has not been initiated within one year, follow-up consultation should be accomplished prior to construction. All FWS ESA Section 7 consultation correspondence is included in Appendix D, pages D-132, D-138, D-147, and D-166. The No-Action alternative would not impact ILTs, nests, or suitable nesting habitat.

4.12.2 Red-cockaded Woodpecker Biological Assessment

A BA was conducted to determine the potential impacts to the RCW and its foraging and nesting habitat. In Louisiana, the greatest concentration of RCWs is on public lands, primarily in the western and central portions of the state (Bulter, 2001).

Suitable RCW foraging habitat consists of mature pine or pine/hardwood forest stands; woodland or savannah in which 50 percent or more of the dominant trees are pines; generally 30 years in age or older, and ten inches or greater diameter at breast height (dbh). Additionally, forest strata requirements for suitable foraging includes mature pine/hardwood forest consisting of an open canopy, low density of small pines, little to no hardwood or pine mid-story, and few or no over-story hardwoods (FWS 2003). Foraging habitat becomes less suitable when the under-story and mid-story vegetation approaches nine feet in height (Davenport 1994).

The RCW is the only woodpecker species to excavate cavities exclusively in the trunks of living pine trees (Zwicker and Walters 1999). Suitable nesting habitat consists of pine and pine/hardwood stands containing pines 60 years in age or older and that are within one-half mile of suitable foraging habitat (FWS 2003). Habitat suitability decreases with increasing density of hardwoods (Hooper and Harlow 1986, Jones and Hunt 1996) and stands with greater than ten percent of canopy

trees where hardwoods were avoided (Jones and Hunt 1996).

RCW habitat suitability was initially identified using 1998 and 1999 National Aerial Photography Program (NAPP) color infrared (CIR) aerial photography. Potentially suitable RCW habitat was identified using general photographic interpretation techniques. All non-forested areas, and pure-stand hardwood and hardwood-dominated forests were identified as unsuitable RCW habitat.

A field survey was conducted in October and November 2006 to identify the location of any RCW or suitable RCW habitat within one-half mile of Line 6 (Draft EIS Preferred Alignment). No RCW individuals or colonies and one potential foraging habitat were observed. The potential foraging habitat was not large enough to support the species. During a December 11, 2006 meeting, Louisiana Department of Wildlife and Fisheries representatives indicated that they were not surprised by the observations and did not have any knowledge of sites along the alignment. Minutes of the meeting are included in Appendix D, page D-136.

The FHWA also determined that the project “may affect, but is not likely to adversely affect” the species. In their May 22, 2007 letter (see Appendix D, page D-138), the FWS again concurred with FHWA’s determination and indicated that no further ESA Section 7 consultation would be

required unless there were changes in the scope or location of the project, or construction was not initiated within one year.

In their September 15, 2010 letter (see Appendix D, page D-166), the FWS reaffirmed that the project was not likely to adversely affect threatened and endangered species and no further consultation was necessary unless there were changes in the project’s scope or location. All FWS ESA Section 7 consultation correspondence is included in Appendix D, pages D-132, D-138, D-147, and D-166. The No-Action alternative would not impact RCW individuals, colonies or suitable foraging or nesting habitat.

4.12.3 State Species of Special Concern

LNHP identified 11 site locations of special concern within the Study Area (see Section 3). No locations of state species of special concern or habitat would be impacted by any of the alignments.

No indirect impacts to state species of special concern would be anticipated from construction or continued use of the proposed highway.

The No-Action alternative could impact several identified locations of state species of special concern within the Study Area that are adjacent to area roadways by routine state or parish maintenance of shoulders and right-of-ways.

4.13 FARMLAND SOILS

All alignments would impact soils identified as prime and statewide farmland (see Table 4-12). A Farmland Conversion Impact Rating Form (Form AD-1006) was completed and forwarded to the NRCS State office in Alexandria for their review and completion. After a selected alignment was identified, a Farmland Conversion Impact Rating Form (Form AD-1006) was completed for the Selected Alignment and Frontage Road using 2011 NRCS soil data. Completed forms are included in Appendix H.

**Table 4-12
FARMLAND IMPACTS**

Alignment	Prime (ac)	Statewide Important (ac)
No-Action	0	0
Line 1	1,143	202
Line 2	1,086	218
Line 3	1,135	203
Line 4	1,111	221
Line 5	1,090	217
Line 6 (DEIS Preferred)	1,130	205
Selected ¹	1,202 ²	-*
Frontage Road (Selected)	42 ²	-*

Source: Michael Baker Jr., Inc.

¹ Selected Alignment is Line 6 with minor modifications

² Updated NRCS Soils 2011

* Louisiana NRCS no longer designates Statewide Important farmland soils

The NRCS office has reviewed the alignments to determine whether any are candidates for protection measures. The Farmland Protection Policy Act (FPPA) states that if the site assessment for any project alternative received a score of 160 points or higher, then the site should receive

consideration for farmland protection. The NRCS has determined that none of the Build alternatives exceed 160 points in Desoto or Bossier Parishes. In Caddo Parish, Line 1 exceeds 160 points by 15 points, Line 2, Line 4, and Line 5 by 11 points, Line 3 and Line 6 (DEIS Preferred Alignment) by 16 points. The Selected Alignment does not exceed 160 points in Caddo Parish.

Due to the extensive agricultural activity in the Study Area, there is no practicable highway alternative that would avoid impacts to this resource. The Preferred Corridor and the subsequent Selected Alignment were developed to balance impacts to environmental resources, including productive farmland soils.

Indirect development at interchanges may result in additional impacts to farmland soils. These impacts cannot be quantified at this time.

The No-Action alternative would not impact farmlands.

4.14 CULTURAL RESOURCES

The identification and assessment of potential cultural resource impacts within the Study Area were initially based on a records search conducted at the Louisiana Division of Archaeology and the Louisiana Division of Historic Preservation. One hundred seventy-two previously recorded cultural resources were recorded within the Study Area (see Section 3). Nineteen of these previously

recorded cultural resources are located within the Preferred Corridor.

A Phase I Cultural Resources Survey was also performed on Line 6 (Draft EIS Preferred Alignment) and the Selected Alignment. The State Historic Preservation Office (SHPO) approved the Final Phase I Cultural Resources Survey report on September 1, 2009.

One hundred thirty-six standing structures were identified. The Palmetto Plantation store (08-03275) was recommended National Register of Historic Places (NRHP) significant. The store, along with several other associated structures (08-03277, 08-03278, and 08-03279), were recommended potentially NRHP-eligible as a historic district.

Thirty-six archaeological sites and six isolated finds were also identified. The 36 sites consisted of three prehistoric, 28 historic, and five multi-component sites with both prehistoric and historic materials. The six isolated finds were historic. Most of the sites were compromised by logging, oil production, or farming activities. One identified site (16BO582) was recommended potentially NRHP-eligible. Access to one potentially NRHP-eligible previously recorded site (16BO196) could not be obtained to reassess the current condition and potential NRHP significance.

The report recommended conducting a Phase I cultural resources survey on the un-surveyed

portions of the Selected Alignment once Project rights-of-way have been acquired or right-of-entry granted. This survey would include reassessing the current condition and potential NRHP significance of previously recorded Site 16BO196. Geomorphological testing would also be conducted along the Selected Alignment within the Red River Alluvial Valley. The geomorphological testing and survey findings would be submitted for Louisiana SHPO evaluation and concurrence as the Project is advanced and funding is available.

All alignments would impact recorded archaeological sites (see Table S-1).

Lines 2 and 5 would impact previously recorded Site 16BO86, a possible Caddoan Farmstead identified by a surface scatter of prehistoric lithics and sherds. Artifacts recorded at 16BO86 include three chert flakes and 4 plain sherds of pottery. The site has an unknown NRHP eligibility status and would require additional testing in order to determine its final NRHP eligibility status.

Line 4 would impact previously recorded Site 16DS353, a possible late Paleoindian to early Archaic upland camp that was identified by a scatter of lithic material uncovered during construction of an oil well pad. Artifacts recovered from 16DS353 include three San Patrice projectile points, flake scrapers, and other chipping debris. The site has an unknown NRHP eligibility status

and would require additional testing in order to determine its final NRHP eligibility status.

Lines 3, 5, 6 (DEIS Preferred Alignment) and the Selected Alignment would impact previously recorded Site 16BO196. Site 16BO196 is a possible late nineteenth- to early twentieth-century farmstead that was identified by shovel testing. Artifacts recovered from 16BO196 include window glass, barrel hoops, and stoneware. The site is considered potentially eligible for listing in the NRHP, and additional testing would be required to determine its final NRHP eligibility status.

Lines 1, 6 (DEIS Preferred Alignment) and the Selected Alignment would impact Site 16BO582, identified during the Phase I Cultural Resources Survey. Site 16BO582 is a multi-component Caddoan and late nineteenth- to early twentieth-century historic site identified by a surface scatter of prehistoric and historic lithics and sherds and shovel testing. Artifacts recovered at 16BO582 include over 250 prehistoric sherds of pottery and chert flakes, 12 historic shreds of pottery, bottle glass sherds, and brick fragments. The site is potentially NRHP-eligible and would require additional testing in order to determine its final NRHP eligibility status. In addition, prehistoric archaeological probability areas were developed to determine, in a broad sense, the likelihood of encountering buried resources. Areas of high, medium and low probability within the Red River Alluvial Valley and upland areas were developed

using data such as terrain characteristics, proximity to water, soil types, locations of previously recorded sites, historic mapping and other documentation as appropriate.

All alignments would potentially impact unrecorded archaeological sites. Lines 1 and 3 would have the greatest involvement with areas of high/medium probability for prehistoric archaeological resources, both within the Red River Alluvial Valley and overall. Lines 2 and 5 would have the least (see Table S-1).

The DOTD, FHWA and the SHPO have reached a consensus for completing the cultural resource efforts and required documentation to satisfy the National Historic Preservation Act (NHPA) Section 106 process. An August 31, 2011 letter agreement identifying continuing efforts to complete the National Historic Preservation Act of 1966 (NRHP), Section 106 process with respect to the Project's effect on cultural resources was prepared by the DOTD and the FHWA, and accepted by the Louisiana State Historic Preservation Officer, and is included in Appendix D, page D-169. The DOTD and FHWA will enter into additional agreements to ensure the successful completion of the NHPA Section 106 process should the findings of additional studies warrant such action.

The No-Action alternative would not impact cultural resources within the Study Area.

4.15 AIR QUALITY

The Project is located within the Northwest Louisiana Council of Government's (the regional metropolitan Planning Organization) (MPO) planning boundaries and is in an area designated as in attainment by the Environmental Protection Agency (see Appendix D, page D-160). Attainment areas are areas that meet the National Ambient Air Quality Standards (NAAQS).

Past modeling of carbon monoxide (CO) emissions have shown that CO emissions from vehicles are decreasing due to improved technology and emission controls. Louisiana is in attainment statewide for CO. CO "hot spot" analyses, assuming worst-case scenarios, have been performed for many years on similar projects across Louisiana, including the North-South Expressway (I-49 North), with no violations of the NAAQS. The North-South Expressway (I-49 North) and I-69 SIU 15 are both 4-lane highways on new location designed to interstate standards in Northwest Louisiana, and have similar traffic volumes. For CO, the NAAQS is 35 parts per million (ppm) for the 1-hour average and 9 ppm for the 8-hour average. It was determined that this project will not violate the NAAQS for CO, as similar projects modeled previously have not demonstrated a violation.

To date, no national standards have been established regarding greenhouse gases, nor has the EPA established criteria or thresholds for

greenhouse gas emissions. FHWA does not believe it is informative at this point to consider greenhouse gas emissions in an EIS. FHWA is actively engaged in many activities with the USDOT Center for Climate Change to develop strategies to reduce transportation's contribution to greenhouse gases in particular CO₂ emissions, and to assess the risks to transportation systems and services from climate change. FHWA will continue to pursue these efforts as productive steps to address this important issue. FHWA will review and update its approach to climate change at both the project and policy level as more information emerges and as policies and legal requirements evolve. Discussions regarding greenhouse gas emissions are ongoing. The Project will comply with new FHWA guidelines

4.15.1 Air Quality Construction Impacts

The use of fuel-powered equipment will result in increased emissions of CO, nitrogen oxides (NO_x), volatile organic compounds (VOC), and particulate matter. Additionally, nuisance dust from roadways may also be a concern in areas on certain construction days, depending on local weather conditions, and the degree and nature of construction activities. Specifications requiring the contractor to tune equipment/motors to manufacturer's specifications will be included in order to reduce air emissions of construction equipment. The Study Area is in attainment for all criteria pollutants; therefore, these minor,

temporary adverse effects will not be substantial or require further evaluation or coordination with regulatory agencies.

Mitigative dust control measures may include: minimization of exposed erodible earth, stabilization of exposed earth with vegetation, mulch, pavement, or other cover as early as possible, periodic application of stabilizing agents (e.g. water), covering or stabilizing stockpiled materials as necessary, and the use of covered haul trucks. The customary practice of burning tree stumps in the clearing and grubbing phase of construction would also increase particulates and other pollutant emissions. Burning alternatives, such as air curtain destructors (equipment that creates nearly complete combustion of vegetative materials with little or no emissions), sending to landfills or on-site composting, would be considered in areas where nuisance dust and particulates becomes a concern.

4.16 NOISE

A noise analysis was prepared in accordance with 23 CFR 772 and DOTD's Highway Traffic Noise Policy (DOTD 2011), which established requirements for any proposed federal or federal-aid project. DOTD requires that highway traffic noise prediction requirements, noise analyses, noise abatement criteria, and requirements for informing local officials in this directive, comply with the noise standards mandated by 23 U.S.C. 109(j).

The Type I traffic noise analysis included the following:

- ❑ Identification of existing activities, developed land, and undeveloped land which is planned, designed, and programmed;
- ❑ Determination of existing noise levels;
- ❑ Prediction of traffic noise levels;
- ❑ Determination of traffic noise impacts; and
- ❑ Examination and evaluation of alternative noise abatement measures for reducing or eliminating the noise impacts.

Sound intensity is typically presented as a sound level using the unit "decibel" (dB). The decibel is used to measure either sound power or sound pressure levels. These sound pressure levels are shown as dBA $L_{eq}(h)$. The term dBA refers to decibels on the A-weighted scale that represents the way the human ear perceives sound. The term $L_{eq}(h)$ refers to an equivalent of an average sound level over an hour's time period.

Table 4-13 shows the DOTD Noise Abatement Criteria (NAC) for various land use activity categories. These criteria are consistent with the FHWA NAC allowing for consideration of traffic noise impacts 1 dBA below the FHWA criteria. Noise impacts occur when the predicted traffic noise levels equal or exceed the DOTD NAC, or when the predicted traffic noise levels exceed the existing levels by 10 dBA. Noise abatement measures would be considered for these sites.

Table 4-13
DOTD NOISE ABATEMENT CRITERIA (NAC)*
HOURLY A-WEIGHTED SOUND LEVEL - DECIBELS (dBA)

Activity Category	Activity L_{eq} (h)	Description of Activity Category
A	56 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	66 (Exterior)	Residential (includes undeveloped lands permitted for residential).
C	66 (Exterior)	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public and nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings. (Includes undeveloped lands permitted for these activities).
D	52	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public and nonprofit institutional structures, radio studios, recording studios, schools and television studios.
E	71 (Interior)	Motels, hotels, offices, restaurants/bars, and other undeveloped lands, properties or activities not included in A-D or F (Includes undeveloped lands permitted for these activities).
F	--	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical) and warehousing.
G	--	Undeveloped lands that are not permitted.

*These criteria are consistent with the FHWA Noise Abatement Criteria (23 CFR 772) allowing for consideration of traffic noise impacts 1-dBA below the FHWA criteria.

Activity Category B, representative of single and multi-family residential dwelling units, was used as the primary criteria for sensitive receptors identified in this analysis. Additionally, Activity Category C receptors were also identified where churches and schools exist.

4.16.1 Prediction of Traffic Noise Levels

Traffic noise calculations were performed for the design year 2030 using the FHWA Traffic Noise

Model (TNM) 2.5 model. Posted speed limits were used for the vehicular speeds on the modeled roadways. Traffic data from the revised NLCOG TDM model (see Section 2.5.5) was used to develop the predictive noise model. Additionally, the model accounted for tree shielding where dense vegetation existed based on aerial photography. Over 200 receptors, representing nearly 260 sites identified using NLCOG 2009

digital orthophotography were modeled to account for areas most likely affected by the Project (see Appendix I).

4.16.2 Traffic Noise Impacts

Noise impacts are determined based on the degree to which the projected noise levels exceed the established noise level activity category criteria, and by how much the levels increase over the existing condition as a result of the proposed highway. Results of the noise analysis for each receptor under all conditions modeled, and the approximate receptor locations and the areas

considered for further noise abatement consideration are included in Appendix I.

DOTD NAC Criteria Impacts

The number of sensitive receptors that equal or exceed the DOTD NAC for all alignments is presented in Table 4-14. All of the impacted receptors are residential dwelling units. For these criteria, Line 3 would have the greatest number of impacts, while Line 1, 4, and 6 (DEIS Preferred) would have the least. Under the No-Action alternative, none of the receptors would exceed the DOTD NAC in 2030.

**Table 4-14
TRAFFIC NOISE IMPACT COMPARISON**

	Existing Year	2030 Design Year No-Action	2030 Design Year Line 1	2030 Design Year Line 2	2030 Design Year Line 3	2030 Design Year Line 4	2030 Design Year Line 5	2030 Design Year Line 6 (DEIS Preferred)	2030 Design Year Selected ¹
Total Number of Sensitive Receptors	262	262	262	262	262	262	262	262	262
Sensitive Receptors Equaling or Exceeding the DOTD Noise Abatement Criteria*	0	0	5	7	9	5	6	5	6
Sensitive Receptors with Substantial Noise Increase Criteria **	N/A	0	44	22	39	25	27	43	42
Total Receptors Impacted	0	0	49	29	48	30	33	48	48

Source: Michael Baker Jr., Inc.

¹ Selected Alignment is Line 6 with minor modifications

* DOTD NAC - 66 dBA for Category B receptors

** An increase of 10 or more dBA over the existing condition

Substantial Increase Criteria Impacts

Table 4-14 presents the number of sensitive receptors where a substantial increase in noise would occur due to the proposed highway. For these criteria, Line 1 would have the greatest noise impact while Line 2 would have the least. All of the impacted receptors are residential dwelling units. The Substantial Increase Criteria does not apply for the existing condition and was predicted to be zero for the No-Action alternative.

Total Number of Impacts

Table 4-14 presents the projected noise impacts for the current year, design year No-Action and design year for each of the Build Alternatives. Line 1 (would have the greatest total number of impacts while Line 2 would have the least. The addition of the Frontage Road would not change the number of impacts for the Selected Alignment.

4.16.3 Noise Abatement

Noise abatement is considered when predicted traffic noise levels either equal or exceed the DOTD NAC, or when the predicted traffic noise levels exceed the existing levels at any sensitive receptor by 10 dBA. Noise abatement measures and procedures are fully described in the DOTD Highway Traffic Noise Policy (DOTD 2011). When noise abatement measures are considered, every effort is made to obtain noise reductions of at least 8 dBA.

Mitigation measures are not required for the existing conditions or the Design Year No-Action alternative because these measures are only analyzed for Type I highway noise impacts. The study included efforts to avoid or minimize noise impacts to sensitive receptors through alignment shifts and overall avoidance of residential areas.

When traffic noise impacts are identified, noise abatement is considered and evaluated for feasibility and reasonableness. In abating traffic noise impacts, primary consideration is given to exterior areas where frequent human use occurs and a lowered noise level would be of benefit.

General Noise Reduction Measures

Several types of noise reduction measures were considered to mitigate noise impacts of the proposed highway, including:

- ☐ Construction of Noise Barriers
- ☐ Traffic management measures
- ☐ Alteration of horizontal and vertical alignments
- ☐ Acquisition of property rights (predominantly unimproved property) to serve as a buffer zone to preempt development which would be adversely impacted by traffic noise
- ☐ Noise insulation of Activity Category D land use facilities listed in Table 4-13.

Traffic management measures include control devices and signing for prohibiting certain vehicle types, time-use restrictions for certain vehicle

types, modified speed limits and exclusive land designations. They would be difficult to enforce.

Comparably, speed reduction was not considered an effective mitigation measure. A substantial decrease in speed would be needed to provide a noticeable sound level reduction. A 10 mph speed reduction would result in only a two-dBA decrease in sound levels.

Reasonable horizontal and vertical alignments for the proposed alignments were developed to minimize and/or avoid impacts to potentially sensitive areas to the fullest extent possible. Any significant sound level reductions at impacted locations as a result of horizontal modifications would require substantial shifts in the proposed alignment, whereby entailing additional property acquisition, require additional environmental studies, and would expose other areas to potential noise impacts from the proposed project. Vertical alignment alteration was also not considered to be a feasible noise abatement measure.

Property rights acquisition would be investigated during final design.

There are no impacted receptors qualifying for sound insulation, and abatement does not need to be investigated for interior receptors.

Noise reduction measures such as earth berms and barrier walls would provide the greatest degree

of noise attenuation. A graded, vegetated earth berm that blends with the surrounding topography is one of the more aesthetically pleasing noise barriers. An earth berm may also provide slightly more attenuation (up to 3 dBA more) than a vertical barrier wall of the same height because of the better absorptive quality of the earth and ground vegetation.

A solid, acoustically opaque barrier (barrier wall) can theoretically reduce noise exposure to a property by as much as 15 to 20 dBA, although a typical reduction is approximately 5-10 dBA. The design can range from relatively simple, straight-line walls to complex designs that blend in with local features such as terrain and neighborhood characteristics.

Both the on-site cost and the degree of noise attenuation are considered in selecting barrier wall materials. It is unlikely that any one barrier wall type or material would be applicable in every situation. The noise abatement analysis was based on ground mounted concrete barriers.

For maximum effectiveness, barriers would be as close as possible to either the source or the receiver and would be high and long enough to adequately mitigate the site.

4.16.4 Determination of Feasibility and Reasonableness

Feasibility

For a noise barrier to be considered acoustically feasible, 75% of the first row of impacted receptors adjacent to the barrier must achieve at least 5 dBA reduction in highway traffic noise. Other feasibility factors considered are safety, barrier height, topography, drainage, utilities, maintenance of the abatement measure, and access to adjacent properties.

Reasonableness

In determining reasonableness, DOTD balances the interests of the overall public good with the social, economic and environmental impacts and the costs of the noise abatement measures. On projects where noise impacts occur, DOTD considers the following:

- ☐ at least one sensitive receptor must receive an 8-dBA reduction in noise levels
- ☐ the cost of the noise abatement measure (including the cost of real estate acquisition, construction servitude or utility relocation) must be equal to or less than \$35,000 per benefited receptor, and
- ☐ there are no relevant objections to the proposed noise abatement from the community, including benefited receptors. If relevant objections are identified, a follow-up solicitation will occur with property owners and residents of the benefited receptors. The

abatement measure will be considered reasonable from the viewpoint of benefitting receptors if 50% or more of the responses received are positive.

Noise Abatement Analysis

Traffic management measures, alteration of horizontal and vertical alignments, acquisition of property rights and noise insulation of Activity Category D land use facilities are not practical. The best noise abatement mitigation measure is a noise barrier. The results of the noise barrier analysis are presented in Table 4-15.

Other receptors not identified are single or sparsely located, and/or affected by other roadways where abatement measures would not be considered cost reasonable and/or feasible.

There are no reasonable and/or feasible noise abatement measures to eliminate or reduce expected highway traffic noise impacts associated with Build alternatives, including the Selected Alignment. Although noise barriers would achieve noise reduction goals, they are unreasonable because they exceed the cost effectiveness criteria of \$35,000 per benefited receptor. No abatement measures would be incorporated into the Project unless, due to changes during final design, they were re-evaluated and determined to be feasible and/or reasonable.

There would be no highway traffic noise impacts associated with No-Action alternative.

**Table 4-15
NOISE BARRIER ANALYSIS**

Alignment & Receptor ID	Effectiveness and Cost				
	Receptors Total (Impacted*)	Barrier Height (ft)	Achieves 5 dBA reduction for 75% or more of impacted First Row Receptors Yes/No (Receptors)	Achieves 8 dBA reduction for one or more impacted Receptors Yes/No (Receptors)	Costs less than \$35,000 per Benefited Receptor Yes/No (Cost)
Line 1					
Receptor ID 4-9	8 (4)	20	Yes (4)	Yes (4)	No (\$617,500)
Receptor ID 21, 22, 24, 26-28, 33-39, 44-52, 56	29 (9)	20	Yes (24)	Yes (13)	No (\$329,500)
Line 2					
Receptor ID 4-9	8 (4)	20	Yes (4)	Yes (4)	No (\$617,500)
Receptor ID 21, 22, 24, 25-28, 33-39, 44-52, 55-57	32 (7)	20	Yes (24)	Yes (13)	No (\$353,300)
Line 3					
Receptor ID 4-9	8 (4)	20	Yes (4)	Yes (4)	No (\$617,500)
Receptors 22, 26-28, 35-39, 44-52, 56, 57	24 (10)	20	Yes (18)	Yes (8)	No (\$370,700)
Receptor ID 23, 29-32, 41, 42, 53, 54	10 (4)	20	Yes (7)	Yes (3)	No (\$914,300)
Receptor ID 88-92	6 (6)	16	Yes (6)	Yes (2)	No (\$509,800)
Receptor ID 116-124, 126	15 (8)	20	Yes (12)	Yes (6)	No (\$308,900)
Line 4					
Receptor ID 4-9	8 (4)	20	Yes (4)	Yes (4)	No (\$617,500)
Receptor ID 21, 22, 24, 25-28, 33-39, 44-52, 55-57	32 (6)	20	Yes (24)	Yes (13)	No (\$353,300)
Line 5					
Receptor ID 4-9	8 (4)	20	Yes (4)	Yes (4)	No (\$617,500)
Receptor ID 21, 22, 24, 26-28, 33-39, 44-52, 56	29 (9)	20	Yes (24)	Yes (13)	No (\$329,500)
Line 6 (DEIS Preferred)					
Receptor ID 4-9	8 (4)	20	Yes (4)	Yes (4)	No (\$617,500)
Receptor ID 21, 22, 24, 26-28, 33-39, 44-52, 56	29 (10)	20	Yes (24)	Yes (13)	No (\$269,600)
Selected¹					
Receptor ID 4-9	8 (4)	20	Yes (4)	Yes (4)	No (\$617,500)
Receptor ID 21, 22, 24, 26-28, 33-39, 44-52, 56	29 (10)	20	Yes (24)	Yes (13)	No (\$269,600)

Michael Baker Jr., Inc.

* Noise impact according to DOTD Highway Traffic Noise Policy.

¹ Selected Alignment is Line 6 with minor modifications

4.16.5 Noise Information for Local Officials

DOTD Noise Abatement Criteria for Activity Category B receptors, representative of single and multi-family residential dwelling units, is 66 dBA.

The highest predicted I-69 mainline volumes are between the US 171 and I-49 interchanges. At this location, the 66 dBA contour is approximately 270 feet from the outer edge of the travel lane. This is

the greatest distance, regardless of travel direction, and would be less at other mainline locations. All Build alternatives, including the Selected Alignment would be similar.

The Final EIS, containing these noise analyses, was provided to the NLCOG, Mayors of Stonewall and Haughton, and the Bossier, Caddo, and Desoto Parish Police Juries to assist these local officials in their planning efforts to limit, to the extent possible, future land development adjacent to I-69 that is incompatible with anticipated highway noise levels.

4.16.6 Construction Noise

Construction noise is expected to have temporary impacts upon all of the receptor areas. Noise caused by construction may include ground clearing, demolition of and removal of existing structures, excavation, foundation placement, and finishing, including filling, paving, grading, and clean up. Noise at any given site would depend on the construction activity and the type of equipment being used.

Construction of the proposed highway would occur in close proximity to most of the identified receptors presented in the noise analysis. If not direct noise impacts from adjacent construction activities, indirect impacts could occur as a result of travel to and from the construction sites. Therefore, all of the analyzed areas would experience varying

degrees of temporary impacts resulting from construction noise.

Abatement measures would be employed whenever possible. All noise abatement measures would be in accordance with the DOTD Highway Traffic Noise Policy (DOTD 2011) and Louisiana Standard Specifications of Roads and Bridges, Section 107.14 (DOTD 2006). These measures include muffling all motorized equipment, establishing haul routes away from sensitive areas, limiting the hours of operation at the sites and locating noisy stationary equipment away from sensitive areas.

4.17 HAZARDOUS MATERIALS

All alignments would encroach upon properties identified as known potential hazardous waste sites. Lines 1, 3, 6 (DEIS Preferred Alignment) and the Selected Alignment encroach on ChemTrade Logistics (formerly known as Arch Chemical, Inc. or Peak Sulfur, Inc.). The facility is identified in EPA databases as a LQG (large quantity generator), CERCLIS-NFRAP (CERCLA No Further Remedial Action Planned), TRIS (Toxic Chemical Release Inventory System), and CORRACTS (Corrective Action Report). In 2004, a NFA BOD (No Further Action - Basis of Decision) was issued for groundwater contamination (LADEQ 2009). A Phase I Environmental Site Assessment (ESA) was conducted for Line 6 (Draft EIS Preferred Alignment) and the Selected Alignment. No

evidence of plant operations were identified during the ESA field investigations on the undeveloped portion of property traversed by Lines 1, 3, 6 (DEIS Preferred Alignment) and the Selected Alignment.

All alignments would encroach upon the most western forested portion of the Louisiana Army Ammunition Plant (LAAP). The LAAP is a CERCLIS – NPL (Superfund) site and a RCRA TSD, SQG and CORRACTS-listed facility. The portion of the LAAP property crossed by the Build alternatives was not involved with any plant operations (Carroll, 2001). No evidence of plant operations were identified during the ESA field investigations. CCS Energy Services, Inc. (formerly known as Arkla Disposal Services, Inc.), is identified in EPA databases as a LQG. In 2007, EPA issued a Corrective Action Order for the collection of soil and groundwater samples to determine the extent of contamination due to previous spills, leaking underground pipe and other compliances issues (LADEQ 2009). The Build alternatives do not encroach on the property, but the property is adjacent to LA 1 interchange for Lines 1, 3, 6 (DEIS Preferred Alignment) and the Selected Alignment. The interchange ramps would be configured during final design to avoid the property.

The No-Action alternative would not impact potential hazardous waste sites.

4.18 ENERGY

With the exception of the No-Action alternative, construction of any of the alignments would require short-term energy consumption. Construction related energy consumption would be generally based on the construction cost of the alternative. The amount of energy required for the production and placement of materials (asphalt, structures, cut, fill, etc.) during construction would be a fixed cost. Construction related energy consumption would be offset over the life of the project by the energy efficiencies gained with the use of an improved transportation facility over many decades. The Project would improve fuel efficiencies due to higher levels of service resulting from uniform speeds, less congestion, and free flow of traffic. The operating efficiency would likely improve on most of these roads, improving levels of service, reducing travel times between destinations, and in turn reducing overall fuel consumption.

4.19 CONSTRUCTION IMPACTS

Highway construction impacts would be limited in duration to the actual construction period and could affect the residences of the immediate construction area and those traveling in the vicinity of the work in progress. The temporary impacts associated with highway construction activities could include:

- ❑ The temporary degradation of air, noise, and water quality;

- ❑ The temporary disruption of traffic for residents, businesses, and travelers, including maintenance, control, and safety concerns;
- ❑ Public health and safety;
- ❑ The stockpiling and disposal of construction materials and waste;
- ❑ The use of borrow areas and the construction and use of haul roads;
- ❑ The temporary disruption of utilities.

4.19.1 Air Quality Construction Impacts

Construction activities can have a temporary impact on local air quality during periods of site preparation, primarily with particulate matter or fugitive dust. This impact would occur in association with excavation and earth moving, asphalt aggregate handling, heavy equipment operation, use of haul roads and wind erosion of exposed areas and material storage piles. The effect of fugitive dust would be temporary and would vary in scale depending on local weather conditions, the degree of construction activity, and the nature of the construction activity.

Mitigative dust control measures may include: minimization of exposed erodible earth, stabilization of exposed earth with vegetation, mulch, pavement, or other cover as early as possible, periodic application of stabilizing agents (e.g. water), covering or stabilizing stockpiled material as necessary, and the use of covered haul trucks. Any abatement measures shall be in strict

accordance with the Louisiana Standard Specifications of Roads and Bridges.

4.19.2 Construction Noise

A temporary increase in noise and vibration is expected during the highway construction period and would be limited to the immediate vicinity of the work in progress. Construction noise and vibration may be associated with ground clearing, demolition of and removal of existing structures, excavation, foundation placement, and finishing, including filling, paving, grading, and clean up. Noise at any given site would depend on the phase of construction and the type of equipment being used.

Noise abatement measures would be employed in accordance with Louisiana Standard Specifications of Roads and Bridges, Section 107.14 (DOTD 2006). These measures include muffling all motorized equipment, locating haul roads away from sensitive areas, limiting the hours of operation at the construction sites, and locating noisy stationary equipment away from sensitive areas.

4.19.3 Water Quality Construction Impacts

Construction activities can create temporary water quality impacts through increased sediment loading. An erosion and sediment control plan will be developed and implemented and will include all specifications and best management practices (BMPs) necessary for control of erosion and sedimentation due to construction related activities.

4.19.4 Maintenance and Control of Traffic

The maintenance of traffic, construction sequencing, and detouring will be planned and scheduled to minimize impacts to local residents, businesses, and the traveling public. Temporary traffic flow impacts are expected to be minimal for those portions of the Project constructed on undeveloped land. Unavoidable traffic flow impacts would occur during grade separations and realignments of existing roadways and interchange construction.

Local and through traffic will be maintained during construction in accordance with the Louisiana Standard Specifications of Roads and Bridges. Maintenance of traffic flow and construction phasing will be scheduled to minimize traffic delays. Access to affected properties will be maintained throughout the construction period. Signing plans will be developed and implemented to inform the general public of work zones, road closures, detours, and other temporary changes. Detour roads will be provided at or near the construction site or a detour route would be signed when traffic cannot be maintained on the existing roadway. The DOTD District Office will notify the traveling public, through the use of press releases, of any proposed detour route before construction begins.

Disruption to the delivery of community and emergency services during construction will be

minimal. The DOTD District Office will notify local police and fire departments and other emergency service providers in advance of any construction-related activities to allow for proper planning and alternate route identification.

4.19.5 Public Health and Safety

During the course of construction, the contractor will comply with all federal, state, and local laws governing safety, health, and sanitation. All reasonable safety considerations and safeguards necessary to protect the life and health of employees on the job, safety of the public, and the protection of property in connection with roadway construction will be taken.

4.19.6 Other Construction Impacts

Utilities include water, sewer, gas and oil pipelines, telephone, and electrical transmission lines. The contractor will contact the appropriate local officials to coordinate a work schedule that will avoid and minimize any disruption of utility services during construction.

The stockpiling and/or disposal of construction materials generated from clearing, grubbing, and other construction phases would be conducted in accordance with local and state regulatory agencies permitting the construction operation. The use of borrow areas and construction of haul roads would also be coordinated with the appropriate local, state, or federal regulatory agencies as necessary.

4.20 CUMULATIVE IMPACTS

4.20.1 Methodology

Definition of Cumulative Impacts

Three types of impacts are routinely assessed for proposed federal actions and are defined by the Council on Environmental Quality (CEQ) regulations (40 CFR Part 1500-1508). Direct impacts are defined as effects that are caused by the action and occur at the same place and time. Indirect impacts, are defined as effects that are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable. Indirect effects may include growth induced effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems (40 CFR Part 1508.8). An example of a direct impact is the taking of a wetland within the right-of-way. An indirect impact could be the conversion of forestland or farmland adjacent to an interchange location for commercial development due to new access provided by this proposed action. Direct and indirect impacts have been previously addressed throughout this section.

Cumulative impacts are defined as the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other action

(40 CFR Part 1508.7). Cumulative impacts include the direct and indirect impacts of a project together with the reasonable foreseeable future actions of others. The cumulative impacts that result from an action may be undetectable but can add to other disturbances and eventually lead to a measurable environmental change.

The assessment of cumulative impacts is required by the CEQ regulations and although indirect and cumulative impacts are not specifically defined or referenced in FHWA regulations for preparation of environmental impact statements (23 CFR Part 771), they have been addressed in a FHWA 1992 position paper titled "Secondary and Cumulative Impact Assessment in the Highway Impact Development Process". This paper encourages incorporation of cumulative impact issues into the highway development process in order to fulfill the NEPA mandate of environmentally sensitive decision-making.

Description of Reasonably and Foreseeable Future Actions and Time Line

One major Federal reasonably and foreseeable future action, the National I-69 Corridor, has been identified in the vicinity of the Project that could induce potential cumulative effects on the social, natural, and cultural environments. This project is subject to separate environmental analysis; their quantifiable impacts are not included in this discussion.

The National I-69 Corridor was divided into 32 viable sections of independent utility (SIU) so that each can be constructed in a reasonable time frame by the states involved. A given SIU may be in place for several years before an adjacent section is completed and open to traffic (AHTD 1999). Therefore, adjacent segments of the National I-69 Corridor are considered as reasonable and foreseeable future actions.

I-69/Trans-Texas Corridor

A NOI was issued by the FHWA in January 2004 to prepare a Tier One EIS to determine the location of an I-69/Trans-Texas Corridor. The Corridor Study includes SIU 16 of the National I-69 Corridor from U.S. Highway 171 near Stonewall in DeSoto Parish, Louisiana to U.S. Highway 59/U.S. Highway 259 near Nacogdoches in Nacogdoches County, Texas. SIU 16 lies to the south of, and connects with, the I-69 Project. After the Tier One decision was made, the FHWA was to proceed with the I-69 highway component by performing project-level studies in a Tier Two decision process. Other federal, state, and/or local agencies would pursue project decisions for the non-highway modes after the Tier One decision. Tier One Draft EIS was approved for circulation and public review in November 2007. In 2009, the Texas Department of Transportation (TxDOT) decided to phase out the all-in-one corridor concept in favor of developing separate rights-of-way for road, rail, and other infrastructure using more traditional corridor widths

for those modes. FHWA rescinded the NOI in 2011 because the joint I-69/TTC concept described in the 2004 NOI was no longer under consideration. The National I-69 Corridor SIUs in Texas and into Louisiana will be advanced through the NEPA process as Federal and State funding becomes available.

I-69, Section of Independent Utility 14

In March 2003, a NOI was issued by FHWA to prepare an Environmental Impact Statement on a proposal to construct Section of Independent Utility SIU 14 of the National I-69 Corridor from I-20 near the town of Haughton in Bossier Parish, Louisiana to U.S. Highway 82 near El Dorado in Union County, Arkansas. SIU 14 lies to the north of the Project. The Draft EIS was approved for circulation and public review in March 2005. The Final EIS was distributed for public review in September 2011 and FHWA issued the Record of Decision (ROD) on April 27, 2012. For more information visit, <http://www.i69arkla.com/>.

High Priority Corridor 1

Congressionally-designated High Priority Corridor (HPC) 1 connects Shreveport Louisiana with Kansas City, Missouri. Within Louisiana, HPC 1 was divided into two separate studies, I-49 North (formerly known as the North-South Expressway) from I-220 to the Arkansas state line; and the I-49 Inner City Connector from I-20 to I-220. I-49 North is in various stages of final design and construction.

Feasibility studies were completed on the I-49 Inner City Connector and the NEPA process was initiated in late-2011.

LA 3132 (Inner Loop Extension)

The Shreveport-Bossier Metropolitan Area Transportation Plan (NLCOG 1989) identified the future extension of LA 3132 (Inner Loop) as part of the orderly development of the regional transportation system to meet future traffic demands. LA 3132 currently terminates at LA 523 (Flournoy-Lucas Road) approximately 1.6 miles from the LA 1 – LA 523 intersection. DOTD is currently evaluating the feasibility of extending the Inner Loop to LA 1 and I-69. The feasibility study is expected to be completed in mid-2012 and the NEPA process initiated at the conclusion of the feasibility study.

US Air Force Global Strike Command

On August 7, 2009, the U.S. Air Force Global Strike Command (AFGSC) was activated at the Barksdale Air Force Base (BAFB). The AFGSC is the Air Force's newest command and is responsible for the nation's three intercontinental ballistic missile wings, two B-52 Stratofortress wings and the only B-2 Spirit wing. Its mission is to develop and provide combat-ready forces for nuclear deterrence and global strike operations -- safe, secure, effective -- to support the president of the United States and combatant commanders (AFGSC 2011). A new entrance into BAFB at the

existing I-20/I-220 interchange is under evaluation. An Interchange Justification is being prepared for DOTD and FHWA approval. There currently is no schedule for preparing a NEPA document.

Geographic Limits of the Analysis

The limits of the Project are contained within the boundary of the National I-69 Corridor. Therefore, consideration of potential cumulative impacts as the result of the National I-69 Corridor and adjacent SIU's is limited to the geographic areas potentially affected by the Project when it becomes connected with, and becomes a part of the fully completed National I-69 Corridor.

4.20.2 Potential Cumulative Impacts

For any given resource within the Study Area, a potential cumulative impact was only studied in this EIS if the resource is impacted directly or indirectly by a highway alignment. Potential cumulative impacts to specific human and environmental resources within the Study Area are as discussed below.

Economics

It has been previously demonstrated (AHTD 1995, 1997) that construction of the National I-69 Corridor would provide positive economic benefits primarily derived from an increase in transportation efficiency via the movement of freight and people. An increase in efficiency would result in time savings, reduced vehicle operating costs, improved safety (lower

insurance costs, reduced crashes), and improved access to other regions of the state and country. Moreover, it is estimated that such a facility would result in thousands of additional jobs and billions of dollars in wages. The completion of the National I-69 Corridor would provide markets outside the Shreveport-Bossier Metropolitan area direct access to the local economic base in addition to responding to economic concerns by providing better access to the Port of Shreveport-Bossier. The construction of the Project would additionally help to stimulate the economic growth of the region.

Land Use

The Project would likely have cumulative impacts in terms of land development. In general, more development would be expected at interchanges near larger communities and would likely decrease as the interchange location moves further from the population centers. The construction of the National I-69 Corridor, SIU 14, and implementation of the AFGSC would provide greater opportunity for development, which could induce cumulative impacts in these areas. This development may occur in stages as more sections of I-69 are completed. However, the potential for development would depend on the availability of undeveloped land in the area and is not necessarily due to access to the area by an interchange.

Displacements

One of the most important functions of the corridor location study is the identification of homes, churches, schools, businesses, and community centers. This process was undertaken to minimize to the greatest extent possible, impacts to the human environment. The majority of land traversed by the Project is rural consisting of pine, bottomland and hardwood forests, pastures and cropland. Denser residential areas are predominantly located near the larger population centers such as Stonewall and Haughton. Scattered residences can be found in rural areas along state and U.S. highways.

Future construction of the National I-69 Corridor, and adjacent SIU's could induce additional displacements as the synergy of these large transportation facilities in close proximity to one another serve to draw additional business and industry to the region. However, the location and quantity of such displacements cannot be determined at this time.

Noise

Cumulative impacts due to noise could occur from the construction and operation of the National I-69 Corridor and the adjacent SIU's. As these projects are completed, traffic volumes could increase in the Study Area and additional traffic related noise could be generated. However, the noise analysis found very few receptors that would experience a noise

impact due to the rural setting of the Study Area. This trend would be similar for any future cumulative noise.

Environmental Justice

An environmental justice analysis (see Section 4.2) was conducted to demonstrate that the proposed action would not disproportionately impact elderly, low income or minority populations. Therefore, no cumulative negative impact is anticipated by the identified foreseeable future actions. Future benefits by all socioeconomic classes could be further realized with the completion of the National I-69 Corridor as employment opportunities expand.

Farmland and Hazardous Materials

No cumulative impacts to farmland or hazardous materials are anticipated in the Study Area by the National I-69 Corridor or adjacent SIU's. No additional right of-way or direct farmland conversion between the project's termini (US 171 near Stonewall and I-20 near Haughton) would result from the future construction of these projects.

Cultural Resources

The construction of the National I-69 Corridor, adjacent SIU's, or the implementation of the AFGSC would provide greater opportunity for development. Terraces, floodplains, bayous and streams typically are high probability areas for cultural material. Development in these areas

could potentially impact unrecorded archaeological sites.

Wetlands and Floodplains

Cumulative wetland and floodplain impacts could occur near interchanges from additional development due to the construction of the National I-69 Corridor and adjacent SIU's. The availability of these large transportation facilities in close proximity to one another could serve to draw additional business and industry to the region.

Threatened and Endangered Species

One federally listed species, the Interior least tern, has been documented within the Study Area. The Study Area also contains potential habitat for the Red-cockaded woodpecker, a federally listed species. As discussed in Section 4.12, biological assessments were conducted for the Selected Alignment, 1,500 feet up- and down-stream of the Red River Bridge crossing for the Interior least tern and within one-half mile of the roadway for the Red-cockaded woodpecker. No occurrences of, or suitable habitat for, those species was identified. Therefore, no cumulative impacts are anticipated.

Wild and Scenic Rivers

No wild and scenic rivers are located within the Study Area. Therefore, no cumulative impacts are anticipated.

Surface Water Bodies/Water Quality

The Study Area includes portions of the Red River drainage basin. Within this basin exists intermittent and perennial streams. The operational use of additional traffic from the future construction of the National I-69 Corridor, and adjacent SIU's projects would not induce additional physical alterations to these surface water bodies. However, future additional traffic could result in cumulative impacts to surface water resources due to additional roadway related pollutants and accidental spills of hazardous materials. Roadway related pollutants are best mitigated through the use of stormwater management practices.

Natural Communities and Wildlife

Future construction of the National I-69 Corridor, and adjacent SIU's could induce additional impacts to the natural community as the synergy of these large transportation facilities in close proximity to one another serve to draw additional business and industry to the region. Cumulative impacts to aquatic species and wildlife could occur due to construction of the National I-69 Corridor and adjacent SIU's. Additional vehicles could generate more sediment for deposition in area streams. The mortality rate of wildlife could also increase, however, as outlined in Section 4.12, wildlife in the Study Area display a broad habitat distribution and are not restricted to a particular habitat type.

4.21 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

Short-term impacts to the human and natural environment are anticipated by the construction of the proposed highway. Impacts to the human environment would include the relocation of families and businesses. The DOTD relocation program would minimize this inconvenience to the extent possible. Improved access within the Study Area could stimulate long-term residential and commercial growth as well as create short- and long-term employment opportunities.

Short-term impacts to the natural environment would include erosion and siltation of local creeks and bayous. Implementation of an approved erosion and sedimentation control plan would minimize these impacts. Long-term impacts to wetlands involve fill required for construction of the proposed highway. Successful creation or restoration of wetland habitat would mitigate for these long-term impacts. Short-term wildlife impacts would involve the disruption and displacement of species during construction. Long-term impacts would include the conversion of vegetative cover to a transportation use.

4.22 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Construction of the proposed highway would require a commitment of land, labor, natural resources, and financial resources. Land used for

the proposed highway would be considered an irreversible commitment during the life of the facility. If a greater need arises for the use of this land in the future, the highway could be converted to another use. However, presently, there is no need to consider that this would occur.

Labor, construction materials, and fossil fuels for construction vehicles and equipment would be used during construction. Labor and natural resources would be used to fabricate construction materials. Generally, these materials are not retrievable. The use of these materials would not have an adverse effect on the continued availability of these resources.

Construction of the proposed highway would require funding from Federal and State sources. These funds would be committed to the construction and maintenance of the facility and not available for other uses.

4.23 ENVIRONMENTAL MITIGATION, COMMITMENTS AND PERMITS

Throughout this project, the DOTD and FHWA have consulted and coordinated with several federal and state agencies, as well as the public, regarding important issues. Many issues have been resolved throughout the course of the preparation of this Final EIS. The resolution of other issues cannot be completed until the project moves forward into the next phase of design, when additional information becomes available. These

issues have been resolved by agreeing to the manner in which they will be addressed at a later date. The following summarizes the required permits, and the agreements and commitments that have been reached for this project.

Design Requirements

- ❑ The Selected Alignment will require a Design Exception because the interchange with I-49 is less than the three-mile spacing between rural interchanges specified in the AASHTO Interstate Design Standards (AASHTO 2005) and DOTD Engineering Directives (DOTD 2006). Per DOTD requirements the Design Exception would be requested during final design.
- ❑ Crossovers would be provided for emergency access. The number and location of the emergency crossovers would be determined during final design.
- ❑ Red River Bridge design requirements include:
 - The required vertical clearance is 62 feet above the normal pool elevation
 - The resulting minimum horizontal clearance for the navigation span shall be 300 feet, measured normal to the flow of the river
 - Piers shall not be placed through existing levees or foundations constructed in and around levee's toe of slope
 - New facilities crossing levee systems must ensure a 15-foot minimum vertical clearance above the top of levees

- Levee armoring with riprap or revetment mats may be required in the shadowline of the proposed structure to mitigate erosion and loss of vegetation
- During final design, a comprehensive barge impact study will be conducted to ensure that piers within the 100-year floodplain are impact worthy and a detailed navigation study will be coordinated with the USCG
- The final main span unit configuration, pier sizes, and construction methods will be established during final design
- Navigation lighting will be in accordance with 33 CFR 18
- Detailed hydrology and hydraulic studies will be performed during the final design (see Floodplains above)
- Engineering “No Rise” Certificates will be prepared during final design and submitted to the Parish Floodplain Administrators for review and approval

Permits

- ☐ State Water Quality Certification issued by the Louisiana Department of Environmental Quality, as required by Section 401 of the Clean Water Act.
- ☐ Clean Water Act Section 404 permit issued by the U.S. Army Corps of Engineers for the placement of dredged or fill material in waters of the United States. A draft Section 404 permit application for the Selected Alignment is included in Appendix O.
- ☐ National Pollutant Discharge Elimination System (NPDES) Permit required by Section 402 of the Clean Water Act issued by

the Louisiana Department of Environmental Quality.

- ☐ Louisiana Pollutant Discharge Elimination System (LPDES) permit issued by the Louisiana Department of Environmental Quality.
- ☐ Bridge Permit issued by the U.S. Coast Guard (USCG), pursuant to the General Bridge Act of 1946, for crossing the Red River, a navigable waterway. No other USCG Bridge Permits are required
- ☐ Levee Crossing Permit that includes letter of “no objection” from the COE, Vicksburg District and permits issued by the Bossier and Caddo Levee Districts.
- ☐ Construction and maintenance agreements will be coordinated as needed with the railroads during final design.
- ☐ No permits have been secured or permit applications submitted for the Project.

Corridor Preservation

- ☐ At this time, the DOTD has no plans to develop a management approach and prepare a formal corridor preservation plan for the Project. A joint cooperative endeavor agreement will be entered into between DOTD, FHWA, NLCOG and/or other municipalities should future preparation of a corridor preservation plan be warranted.

Relocations

- ❑ During final design of the highway, further consideration will be given to reducing residential and business displacements. All displaced residents will be provided with relocation assistance by the DOTD and every reasonable effort will be made to relocate affected residents within their immediate community.
- ❑ The DOTD will provide relocation assistance to residences and businesses displaced during acquisition of right-of-way in accordance with the Federal Uniform Relocation Assistance and Real Property Policies Act of 1970. The DOTD is committed to assist with locating replacement housing within the occupant's financial means and within the general area of the project and when necessary providing housing of last resort. Real estate availability will be reassessed once final design of the highway has been completed. The DOTD publication, "Acquisition of Right of Way and Relocation Assistance" is included in Appendix K for further information.

Oil and Gas Resources

- ❑ In conjunction with the right-of-way acquisition process, a qualified petroleum engineer will conduct a feasibility study for each impacted well to determine the estimated reserves.
- ❑ All wells impacted by the proposed highway would be properly abandoned according to

procedures established by the Louisiana Department of Environmental Quality.

- ❑ During final design of the highway, individual gas and oil collector lines would be identified. When possible, these lines would be avoided or relocated to continue service to these well sites.

Water Quality

- ❑ The DOTD will minimize non-point discharge water quality impacts and will comply with all requirements of the Clean Water Act, as amended, for the construction of this proposed highway. A Stormwater Pollution Prevention Plan will be prepared in conjunction with the NPDES permitting. This Plan will include all specifications and best management practices (BMPs) necessary for control of erosion and sedimentation due to construction-related activities.
- ❑ Mitigation measures will be implemented as part of the design and construction of the Project to reduce impacts resulting from stormwater runoff. These measures will include:
 - Implementation of a LADEQ approved Erosion and Sedimentation Control Plan
 - Use of properly sized and engineered culverts for stream crossings to minimize impacts attributed to flood height and flood duration
 - Construction of detention treatment facilities where necessary

- Perpendicular stream crossings where practicable
- Scheduling construction activities to minimize exposed areas and duration of exposure
- Prompt re-vegetation of all disturbed areas
- Minimize duration of in-stream work by heavy equipment
- Control of runoff within the right-of-way limits using temporary stormwater management ponds before discharging into receiving streams
- Use of gentle slopes and wide shallow channels for grassed swales to remove pollutants through filtration, settling, and infiltration
- Designation of impervious areas for construction equipment, vehicle storage, and fuel to minimize accidental spills.
- Storing fuels, other similar materials, and construction vehicles and equipment away from designated Well Head Protection Areas.

Floodplains

- ❑ Detailed hydrology and hydraulic studies will be performed during the final design to demonstrate that proposed encroachments would not result in any increase in flood level due to construction that would violate applicable floodplain regulations, including National Flood Insurance Program Regulations and Bossier, Caddo and DeSoto Parishes Flood Ordinances. DOTD and FHWA will review these studies to confirm that adequate measures have been taken to insure that floodplain encroachment does not increase the risk of flooding to adjacent properties. These

studies, along with applicable Engineering “No Rise” Certificates, will be submitted to the Parish Floodplain Administrators for review and approval.

Wetlands

- ❑ Under the combined authority of Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, the COE has determined that there will be impacts to jurisdictional waters of the United States, and issued a Preliminary Jurisdictional Determination (JD) for the Selected Alignment (see Appendix N).
- ❑ The DOTD will attempt to further minimize wetland impacts during the final design phase of the project when practicable. All unavoidable wetland impacts will be mitigated for by the DOTD and the FHWA. Final mitigation ratios and requirements will be determined during an evaluation of the Project pursuant to Section 404 of the Clean Water Act. This evaluation process will take place after issuance of the Record of Decision.
- ❑ The DOTD and its contractors will not excavate, fill, or perform land clearing activities within Waters of the United States or any areas under jurisdiction of the COE, except as authorized by the COE. The DOTD will require its contractors to comply with all local, state, and federal regulations.

❑ Construction-related wetland impacts will be avoided through implementation of mitigation measures, including:

- Wetlands outside the construction limits will not be used for construction support activities (borrow sites, waste sites, storage, parking access, etc.) unless the contractor obtains Section 404 permits from the Corps of Engineers
- Clearing of wetland vegetation will be limited to the minimum required for job completion
- Coordination with the contractor to ensure that all appropriate measures will be taken to protect the water quality of adjacent wetlands through the use of straw bales, silt fencing, and seeding and mulching.

Threatened and Endangered Species

❑ Biological assessments were conducted for the Interior least tern (*Sterna antillarum*) and Red-cockaded woodpecker (*Picoides borealis*) and the FHWA determined that the project “may affect, but is not likely to adversely affect” either species. The U.S. Fish and Wildlife Service (FWS) concurred with FHWA’s determinations and indicated no further Endangered Species Act (ESA) Section 7 consultation was required unless there were changes in the scope or location of the Project, or if project construction has not been initiated within one year. If the project has not been initiated within one year, follow-up consultation should be accomplished prior to construction. (see Appendix D, page D-166 for the latest correspondence). The Record of Decision will

document FWS concurrence with FHWA’s ILT and RCW determinations, and completion of the ESA Section 7 consultation.

Cultural Resources

- ❑ A Phase I Cultural Resources Survey was conducted to identify archaeological and historic resources along the Draft EIS Preferred Alignment (Line 6) and the Selected Alignment. The Louisiana State Historic Preservation Officer concurred with the survey findings and National Register of Historic Places eligibility presented in the Final Phase I Cultural Resources Survey Report.
- ❑ An August 31, 2011 letter agreement prepared by DOTD, identifying continuing efforts for completion of the National Historic Preservation Act of 1966, Section 106 process with respect to the Project’s effect on Historic Properties was accepted by the Louisiana State Historic Preservation Officer (see Appendix D, page D-169).

Hazardous Materials

- ❑ A Phase 1 Environmental Site Assessment was conducted along the Draft EIS Preferred Alignment (Line 6) and the Selected Alignment. The Selected Alignment encroaches on properties identified as known potential hazardous waste sites, but those encroachments were in locations where plant operations did not occur and there was no evidence of contamination. If areas of

hazardous materials contamination are identified, appropriate measures will be taken to remediate the areas prior to construction.

- ❑ The interchange at LA 1 for Lines 1, 3, 6 (DEIS Preferred Alignment) and the Selected Alignment is adjacent to CCS Energy Services, Inc. (formerly known as Arkla Disposal Services, Inc.), an identified hazardous materials site. The interchange ramps will be configured during final design to avoid the property.

Traffic Analysis

- ❑ The regional traffic model maintained by the North Northwest Louisiana Council of Governments (Shreveport-Bossier City area Metropolitan Planning Organization (MPO)) was expanded to include the entire Study Area, and a revised traffic analysis performed to evaluate and verify the serviceability of the highway system and the I-69 conceptual interchanges. All locations are projected to operate at an acceptable level of service. An Interchange Justification Study (IJS) engineering and operational determination was found acceptable by FHWA on January 18, 2008 for the proposed Project interchanges with I-49 and I-20 (see Appendix D, page D-140).
- ❑ The MPOs regional traffic model was subsequently revised to include additional interchange access to the Barksdale Air Force

Base (BASF) and forecast traffic volumes for the I-69 Project as part of the entire National I-69 Corridor (Full Build) as well as for a stand-alone section of independent utility (Partial Build). A revised traffic analysis was performed to evaluate and verify the serviceability of the highway system and the I-69 conceptual interchanges, including the Project interchanges with I-49 and I-20. The revised traffic analysis concluded that all locations are projected to operate at an acceptable level of service, as previously determined in the IJS. The revised traffic analysis and results will be submitted to FHWA. The results are included in Section 2.

- ❑ There were no significant changes in condition therefore final approval of the IJS may be given after issuance of the Record of Decision. If the Project has not progressed to construction within eight years of receiving affirmative determination of the engineering and operational acceptability from FHWA, a re-evaluation is required.

Air Quality

- ❑ The Project is located within the Northwest Louisiana Council of Government's (the regional metropolitan Planning Organization) (MPO) planning boundaries and is in an area designated as in attainment by the Environmental Protection Agency (see Appendix D, page D-160).

❑ Mitigation measures to reduce air quality construction impacts will include:

- Specifications requiring the contractor to tune equipment/motors to manufacturer's specifications in order to reduce air emissions of construction equipment
- Burning alternatives, such as air curtain destructors (equipment that creates nearly complete combustion of vegetative materials with little or no emissions), sending to landfills, or on-site composting, in areas where nuisance dust and particulates becomes a concern.

Noise Analysis

❑ The regional traffic model maintained by the North Northwest Louisiana Council of Governments (Shreveport-Bossier City area Metropolitan Planning Organization (MPO)) was expanded to include the entire Study Area and subsequently revised to include additional interchange access to the Barksdale Air Force Base (BASF) and forecast traffic volumes for the I-69 Project as part of the entire National I-69 Corridor (Full Build) as well as for a stand-alone section of independent utility (Partial Build). Receptors accounting for areas most likely affected by the Project were identified using NLCOG 2009 digital orthophotography. The predictive noise model was revised and the traffic noise reanalyzed. Noise abatement measures are not warranted for any of the Build alternatives, including the Selected Alignment, because they do not satisfy the DOTD cost effectiveness criteria.

❑ The Final EIS, containing the noise analyses, will be provided to the NLCOG, Mayors of Stonewall and Haughton, and the Bossier, Caddo, and Desoto Parish Police Juries to assist these local officials in their planning efforts to limit, to the extent possible, future land development adjacent to I-69 that is incompatible with anticipated highway noise levels.

Navigation

- ❑ In accordance with 23 USC 144(h), (23 CFR Section 650.805), FHWA determined that a USCG bridge permit is required for portions of the project spanning the Red River at RM 212.2 and that no other USCG bridge permits were required. USCG concurred with FHWA's determination (see Appendix D, page D-174).
- ❑ A Conceptual Red River Bridge Study was conducted to provide information relative to navigation and the effects the bridge will have on navigation interests using the waterway. Pier locations, horizontal and vertical clearances, and the alignment of the main channel navigation opening and approach spans were established; and hydrologic/hydraulic and scour analyses performed. The results are presented in Section 2. The USCG reviewed the study in coordination with the COE and various waterway associations, and found the study

acceptable and determined that no further reviews were necessary at this time (see Appendix D, page D-177). Detailed navigation

studies and collision design alternatives, and the Bridge Permit application, will be coordinated with the USCG during final design.